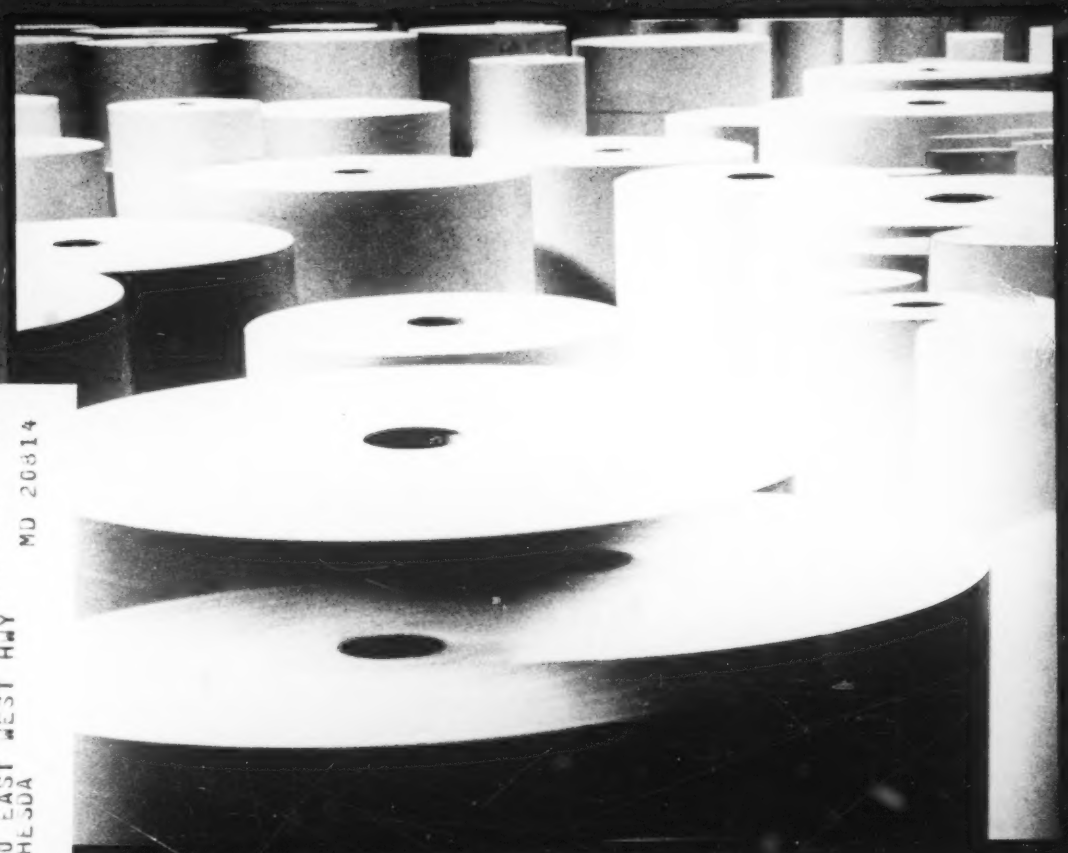
PULP & PAPER

January 1991



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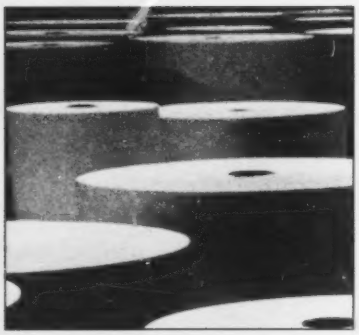
U.S., Canadian paper industry will remain competitive during economic slowdown • 57

Capital spending declines after seven record years • 101

Volume 65
Number 1

JANUARY



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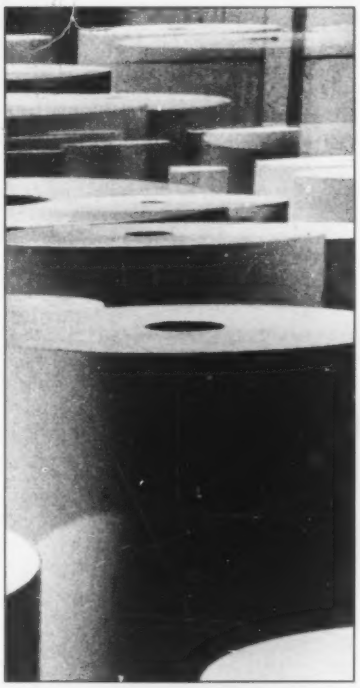

THE COVER

This issue's Outlook '91 (p. 57) and Capital Spending (p. 101) reports examine an expected decline in operating rates, earnings, and modernization/expansion outlays this year, as well as several positive factors, such as a continuing weak dollar on the European market—concluding that the North American paper industry should remain basically healthy and competitive this year. **(Photo courtesy of Jagenberg Inc.)**

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JANUARY

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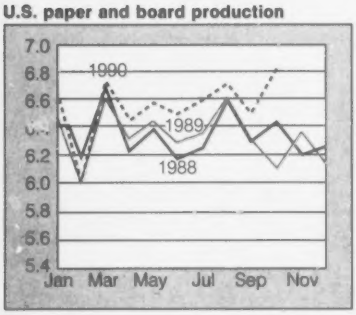
ABP

BPA

U.S. paper and board production



U.S. production of paper and paperboard totaled 6.8 million tons in October, up 3.1% from a year earlier, according to the American Paper Institute. The seasonally adjusted rate of production reached a new high of 78.3 million tpy. Production has strengthened all year, especially since July, despite the slowdown in the general economy. Demand indicators for paper and board grades are up 2.3% and 1.0%, respectively, over last year. Producers have maintained low inventory levels so that current output flows directly to consumption, API reports.

Among major grades, newsprint production was up 8.6% due to the startup of four new machines since mid-1989. Printing and writing shipments posted a 3.5% increase over last year, on the strength of a 5.0% rise in coated paper shipments and a 3.8% increase for uncoated free-sheet. Containerboard leads the paperboard grades, with production up 2.2% through October.

Canadian newsprint shipments totaled 710,000 metric tons in October, down 16.7% from the same month last year. Operating rates plunged from 98% last year to just 80%. Woodpulp shipments were up 3.2% to 705,000 tons, with operating rates falling to 82%, down from 90% in October 1989. ■

	Latest month (000 short tons)		% change from year ago	Annualized year-to-date (000 short tons)	% change from year ago
PAPER & PAPERBOARD PRODUCTION[1]					
Newsprint	Oct.	563	7.0	6,569	8.6
Uncoated groundwood (s)	Oct.	168	0.6	1,763	0.0
Coated paper (s)	Oct.	689	5.5	7,572	5.0
Uncoated free-sheet (s)	Oct.	1,010	4.3	11,568	3.8
Other printing/writing	Oct.	136	2.3	1,581	3.6
Total packaging and other paper (s)	Oct.	415	-5.0	4,649	-5.2
Tissue	Oct.	489	0.0	5,788	2.6
Total paper	**Oct.**	**3,469**	**2.8**	**39,490**	**3.1**
Unbleached kraft paperboard	Oct.	1,754	26.0	20,212	3.0
Semichemical medium	Oct.	480	1.7	5,688	-0.3
Bleached paperboard	Oct.	343	-9.3	4,407	-2.5
Recycled paperboard	Oct.	764	0.4	8,815	-0.4
Total paperboard	**Oct.**	**3,341**	**3.4**	**39,121**	**1.1**
Total U.S. paper and paperboard output	**Oct.**	**6,810**	**3.1**	**78,611**	**2.1**
PULP, WASTEPAPER & FIBER[2]					
Total U.S. woodpulp production	Sept.	5,200	2.7	63,129	1.4
Market pulp production	Sept.	735	3.2	8,908	0.6
Wastepaper consumption at paper/board mills	Sept.	1,817	8.9	21,273	6.6
Pulpwood consumption (cords)	Sept.	843	-89.7	99,280	0.6
CONVERTED PRODUCTS STATISTICS[3]					
Corrugated box shipments (billion ft²)	Oct.	30.526	5.3	269.437[6]	1.7
Containerboard inventories at U.S. box plants and mills	Oct. 1	2,570	-2.8		
INTERNATIONAL TRADE[2]					
U.S. paper imports (including products)	Sept.	988	-6.9	13,000	1.7
Imports of Canadian newsprint	Sept.	579	-11.2	8,238[6]	-0.6
U.S. paper exports (including products)	Sept.	580	10.5	8,854	8.8
Exports of unbleached kraft linerboard	Sept.	214	28.1	2,681	20.9
Exports of woodpulp	Sept.	526	-4.0	6,000	-6.2
Norscan pulp inventories[4]	Oct. 31	1,467	38.5		
Norscan pulp operating rates[4]	Oct.	88%	76%	84%	87%
CANADIAN STATISTICS[5] *(reported in metric tons)*					
Total newsprint shipments	Oct.	710	-16.7	7,647[6]	-4.1
Operating rates	Oct.	80%	98%	91%	96%
Inventories held by U.S. consumers	Oct. 31	1,275	1.0		
Other paper/board shipments	Oct.	682	9.3	6,232	7.6
Woodpulp shipments (export only)	Oct.	705	3.2	6,336	-9.0
Operating rates	Oct.	82%	90%	84%	94%

1. American Paper Institute. 2. API, Bureau of Census, American Pulpwood Assn. 3. Fibre Box Assn., Paperboard Packaging Council. 4. North American/Scandinavian paper-grade market pulp. 5. Canadian Pulp & Paper Assn. 6. Not annualized. (s) = Shipments.

Kraft linerboard: Strong export demand should help keep market in balance

Grade structure: Unbleached kraft linerboard is made in a wide range of basis weights. Standard weight in the U.S. is 42 lb/1,000 ft², but other important weights are 26 lb, 33 lb, 69 lb, and 90 lb/1,000 ft². Major end use is in domestic corrugated container production, although about 13% of output is exported.

Regular unbleached accounts for the bulk of U.S. linerboard production, but mottled white, wet strength, high-performance, and other specialty grades have been showing the fastest growth. Tube, can, drum, and miscellaneous grades (520,000 tpy capacity) are included in these statistics. However, recycled linerboard (500,000 tpy) and solid bleached linerboard (190,000 tpy) are excluded.

Production: The U.S. linerboard market has been relatively stable since early last summer thanks to continuing modest growth in domestic corrugated box cutup through October and strong export shipments. U.S. corrugated box shipments were running about 0.8% ahead of a year ago through the first ten months of 1990, according to Fibre Box Assn. data. U.S. linerboard production for export was running more than 12% ahead of last year thanks to the weak dollar and stronger economic growth in Europe and Asia.

The relatively favorable market conditions have kept linerboard mills running at close to 95% of capacity while inventories were at a relatively low level of 2.558 million tons, or 4.9 weeks of supply, at the end of September. Producers were emboldened to announce a price increase of about $30/ton for Oct. 1, which would have returned the list price for linerboard in the eastern U.S. to $410/short ton. The increase was unsuccessful, mainly due to increasing economic uncertainty late last year.

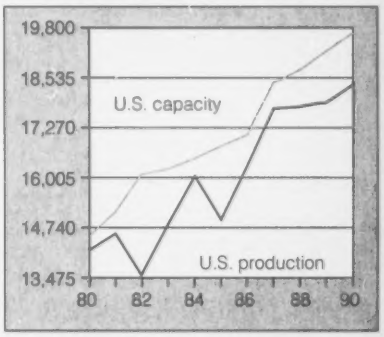
Future outlook: Most economic forecasters think the U.S. economy probably sank into a mild recession (or was at least skirting one) in fourth-quarter 1990. If this is true, corrugated box shipments will probably show a flat to slightly lower performance through at least first- and possibly second-quarter 1991. Then box shipments are expected to rebound in second-half 1991 with a recovery in the U.S. economy. U.S. box shipments for all of 1991 are expected to grow about 1.4%, just about matching industrial production. Domestic linerboard demand, however, may grow about 1.7% due to inventory building by converters from current low levels. Linerboard export shipments are expected to increase about 7% with the weak dollar more than offsetting slower overseas economic growth. As a result, total U.S. linerboard production is expected to increase 2.4% in 1991 to 19.3 million tons from 18.8 million tons in 1990. This should enable linerboard mills to run at about 91.6% of capacity in 1991, down from about 92.8% in 1990 and about 95% in 1988. The first half of 1991 will be the most difficult, with the downturn in the economy and new capacity entering the market from three new machines.

New capacity: Gaylord Container Corp. started up a 357,000-tpy machine at its Bogalusa, La., mill last July. In addition, Mead Corp. plans to produce some linerboard on the 375,000-tpy coated kraft board machine at its Mahrt, Ala., mill, which began production in September. And Union Camp Corp. will be adding about 235,000 net tpy with the startup of a new machine at its Savannah, Ga., mill in first-quarter 1991. While kraft liner capacity expansion will drop off in 1992, recycled will begin to pick up.

Prices: The last successful linerboard price increase to $410/short ton took place in spring 1988. Transaction prices began to erode in second-half 1989 after an unsuccessful attempt to push through a price increase in spring 1989. Transaction prices through the second half of 1990 have remained relatively stable, around $360 to $370 in the eastern U.S. Even though there may be some further slight erosion in transaction prices, the weak dollar should provide some support for domestic prices.

Historical year-end transaction prices for 42-lb linerboard delivered in the eastern U.S. (before zoned rebates) were as follows: 1990, $360/$370; 1989, $390/$400; 1988, $410; 1987, $380; 1986, $320; 1985, $260.

SUPPLY/DEMAND (000 tons)



FORECAST (000 tons)

	1989	1990e	1991e
Production[1]	18,364	18,847	19,305
Capacity[1,2]	19,716	20,302	21,064
Utilization rate	93.1%	92.8%	91.7%
Imports[3]	120	130	140
Exports[1]	2,223	2,512	2,690
Apparent U.S. consumption	16,261	16,465	16,755
lb/capita	130.7	131.0	132.0
GNP ratio[4]	3.95	3.97	4.01

e = estimate.
1. Includes tube, can, and miscellaneous but excludes clay coated boxboard. 2. Based on 1989 API capacity survey. 3. Dept. of Commerce. 4. 000 tons/billion $ of real GNP.

TOP U.S. PRODUCERS (000 tpy)

	Annual capacity	Market share (%)
1. Stone Container	2,890[1]	14.0
2. Georgia-Pacific	2,290[2]	11.3
3. International Paper	1,820	8.9
4. Jefferson Smurfit/CCA	1,560	7.7
5. Weyerhaeuser	1,555	7.6
6. Temple-Inland	1,445[3]	7.1
7. Union Camp	1,375[4]	6.8
8. Packaging Corp.	1,185[5]	5.8
9. Gaylord Container	1,050[5]	5.2
10. Willamette Industries	780	3.8

Market share of top five companies: **49.7%**

Market share of top ten companies: **78.4%**

Total U.S. capacity (kraft and recycled, 1990): **20.339 million tons**

1. Includes all of 60%-owned Seminole Kraft Corp. (350,000 tpy) but excludes Canadian operations (216,000 tpy). 2. Excludes Valdosta, Ga., mill (395,000 tpy) to be sold to PCA/GE Capital by end of 1990. 3. Includes 210,000-tpy recycled liner mill in Ontario, Calif. 4. Does not reflect 235,000-tpy net addition to capacity from new 460,000-tpy linerboard machine expected to begin production in early 1991. 5. Includes total capacity of new 357,000-tpy machine that started up at Bogalusa, La., mill in July 1990.

U.S. Paper Industry Will Manage Economic Slowdown This Year

Operating rates and earnings will decline, but U.S. papermakers will remain competitive

The U.S. paper industry is prepared for the economic slowdown that began in fourth-quarter 1990 and is expected to continue in first-quarter 1991. Paper company executives and financial analysts surveyed by *Pulp & Paper* expect a mild recession at the beginning of this year with a recovery in the second half of the year. Most analysts expect demand for the industry's products to remain weak until the U.S. economy recovers later this year, but exports should offset some of the decline in domestic demand. This will result in a production gain of only 1% for paper products and almost no growth for paperboard packaging grades.

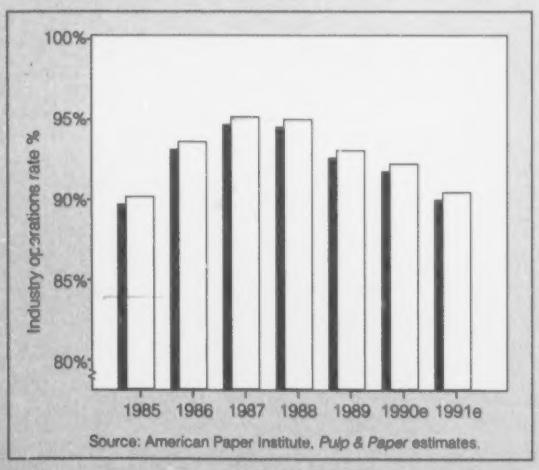
Unfortunately, production capacity will expand by 3.8%, or 3.2 million tons, this year as a result of the industry's huge capital spending program during 1989-91. The three-year boom in capital spending peaked in 1990 at $18 billion, but capacity expansions will not peak until this year. Paper companies plan to spend an estimated $17 billion this year, although this figure may be revised downward as companies postpone or stretch out capital projects as the year goes on. Without these revisions, however, more capacity will be added this year than any year since 1973, and operating rates are forecast to decline to 90.6% for paper grades and 90.2% for paperboard.

Compounding overcapacity problems are industry forecasts of higher costs and declining earnings. Analyst Tom Clephane of Morgan Stanley predicts, "The paper industry will not be able to raise prices because of the 1991 recession and the capacity bulge in a number of grades. We are estimating that the industry's costs will be up 5% this year and profits for an average commodity paper producer will be down 20% to 25% in 1991 following a 25% decline in 1990."

FALLING PRICES. Lawrence Ross of Paine Webber thinks the industry will not be able to maintain even the current price structure, and he expects prices to deteriorate across-the-board. "We expect to see some year-over-year recovery in newsprint prices and generally

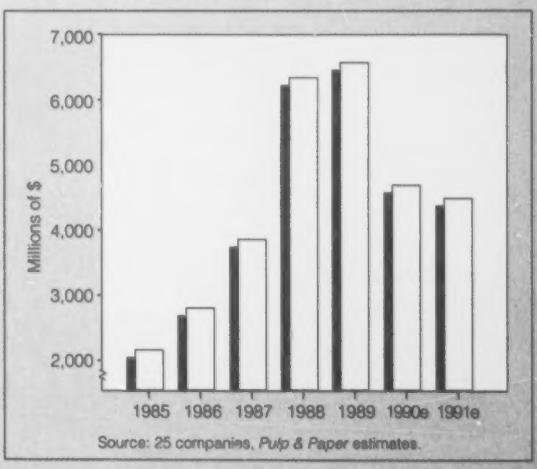
Outlook 1991 was prepared by Pulp & Paper *news editors Will Mies, Debra Garcia, Noel DeKing, Robert Galin, Sophie Wilkinson, and Jim McLaren.*

Operating rates are falling at U.S. paper and board mills...

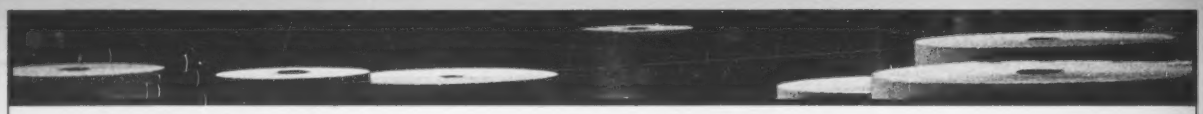


Source: American Paper Institute, *Pulp & Paper* estimates.

...and profits are suffering



Source: 25 companies, *Pulp & Paper* estimates.



flat year-to-year tissue prices but renewed price weakness in uncoated free-sheet and continuing price weakness in coated paper grades and market pulp." Ross predicts that coated paper will have the lowest operating rates in the industry but not necessarily the weakest price structure.

The level of operating rates forecast by most analysts will prevent any price increases this year, with perhaps the exception of tissue and newsprint.

Sherman Chao of Salomon Brothers expects only tissue to report operating rates of 93% or better, the level which generally defines a buyer's market from a seller's market. Newsprint operating rates are likely to average about 90%, but that figure is dependent on the outcome of Canadian labor negotiations. Among the remaining major commodity grades, Chao predicts that bleached board operating rates will average 92% and uncoated free-sheet rates will average 91%, just above the rate needed to maintain stable markets. The weakest operating rates will be coated paper at 88% and linerboard at 89%.

Chao believes that the current downturn may mean greater demand declines for printing/writing paper than for linerboard and packaging grades. This reflects the fact that the service sector now accounts for a larger share of the U.S. economy than the industrial sector.

HIGHER COSTS. Many of the industry's major capital projects are aimed at improving productivity and reducing costs, but most companies will be paying higher prices for raw materials, energy, and labor this year. Prices for woodchips are likely to remain near record levels because of softening markets for wood products and tight timber supplies in the Pacific Northwest. Evadna Lynn, forest products analyst at Dean Witter Reynolds, thinks woodchip costs will continue to rise because of a further decline in wood products output, and fuel and freight costs could rise sharply if the Persian Gulf conflict is not resolved.

The U.S. paper industry has substantially reduced its purchases of fuel oil and natural gas, which should reduce the cost impact of inflated oil prices resulting from the Gulf conflict. Purchased fuel oil accounted for less than 8% of the industry's total energy supply last year, down from 22% in 1972 when more than twice the amount of oil was used. In New England, however, oil provides 36% of the energy used by the pulp and paper industry. In total, the industry relied on purchased fuel and energy for 42.3% of its power supply in 1989. Self-generated and residue sources of energy provide 56.4% of the power supply.

Mark Diverio of Shearson Lehman Brothers says the oil shocks of the 1970s led to a round of capital spending on new recovery and power boilers that improved energy efficiency and increased paper mills' capabilities to use alternative fuels. For example, many mills can alter

TABLE 1: **Analysts' projections for 1991 (percentage change from 1990 levels).**

	Growth in real GNP	Production		Operating rates[1]		Prices		Unit costs[2]	Earnings		Housing starts[3]
		Paper	Board	Paper	Board	Paper	Board		Paper	Forest	
Tom Clephane											
Joanne Carroll											
Morgan Stanley	(0.1)	1.9	1.0	91.7	92.2	1.5	(1.1)	5.0	(20)	(25)	1.05
George Adler											
Smith Barney	(0.3)	2.0	0.2	91.2	89.8	(3.0)	(4.0)	4.0	(20)	(26)	1.21
Evadna Lynn											
Dean Witter Reynolds	0.3	0.7	0.1	89.8	89.9	(2.0)	(2.9)	3.7	(12)	15	0.95
Mark Kurland											
Mabon Nugent	0.0	1.5	0.0	92.0	90.0	(5.0)	(3.0)	3.0	(30)	(40)	1.10
Lawrence Ross											
Paine Webber	(0.2)	(1.0)	(1.0)	89.0	88.0	(3.0)	(4.5)	4.5	(20)	(50)	n.a.
Thomas Farrell											
Deutsche Bank	(0.3)	(2.0)	(2.0)	89.0	90.0	(2.0)	(7.0)	4.0	(25)	(50)	1.10
William Wigder											
First Boston	(0.2)	3.4	2.1	93.0	91.6	(2.0)	5.5	3.0	(20)	(15)	1.05
Sherman Chao											
Salomon Brothers	(0.9)	(0.6)	(0.9)	89.5	89.0	(6.0)	(10.0)	5.0	(25)	(20)	1.10
Gary Palmero											
Oppenheimer & Co.	0.8	1.7	1.7	91.0	91.4	(1.7)	(2.6)	5.3	(13)	(9)	1.20
Mark Rogers											
Prudential Bache	2.0	3.1	3.7	91.8	92.0	1.9	3.8	4.4	1	2	1.35
Chad Brown											
Barclays de Zoete Wedd	(0.7)	(0.4)	(0.7)	88.7	89.1	(1.0)	(1.0)	1.5	(36)	(40)	1.18
Mark Diverio											
Shearson Lehman Brothers	(0.7)	1.5	0.5	91.0	90.5	(3.0)	(2.0)	3.5	(15)	(24)	1.03
Richard Palm											
Merrill Lynch	(0.2)	1.0	(1.0)	90.0	89.0	(2.0)	(2.0)	1.0	(20)	n.a.	1.11
Richard Schneider											
Kidder Peabody	(0.2)	1.2	(0.2)	90.6	89.9	(2.3)	(6.8)	4.3	(14)	(27)	1.05
Average	**(0.1)**	**1.0**	**0.3**	**90.6**	**90.2**	**(2.1)**	**(2.7)**	**3.7**	**(19)**	**(24)**	**1.11**

( ) represents a negative figure, n.a.=not available
1. Production as percent of capacity. 2. Costs/ton of output. 3. Millions of units.
Source: *Pulp & Paper* Survey.

their energy mix to accommodate changes in relative fuel prices. He adds, "From a corporate earnings standpoint, the slowdown in demand as a result of a recession will be much more important than the energy cost impact, although some companies are obviously more dependent on oil than others."

A FEW BRIGHT SPOTS. Despite the current cyclical downturn, the U.S. paper industry remains one of the best-positioned industries in the U.S. economy. The industry's access to relatively cheap energy and low-cost southern woodfiber remains its most enduring competitive edge over major producers in Europe, Scandinavia, and Japan, says Prudential-Bache analyst Mark Rogers. "Should the low valuation of the dollar continue, as we expect, it will provide an important benefit to the industry's ability to begin to boost profitability once paper demand begins to recover," he says.

The low value of the U.S. dollar will enable prices of key paper grades to bottom out at higher levels than in previous industry downturns in 1985 and 1980-82, according to Chad Brown of Barclays de Zoete Wedd. Thus, the cyclical earnings decline is likely to be more severe for paper companies outside the U.S. This cycle will be essential to worldwide producers of newsprint, bleached board, linerboard, and market pulp products sold internationally.

The level of U.S. exports of these products will largely be determined by economic activity outside the U.S. and the choice on the part of U.S. mills to do more exporting. While bleached board export prices should remain stable, most analysts expect export prices of market pulp to decline this year and kraft linerboard export prices to decline slightly.

NO MERGERS. The paper industry's cash flow will not be strong enough this year to support another large merger similar to the Georgia-Pacific Corp./Great Northern Nekoosa Corp. deal in 1990, say most analysts.

However, most observers expect to see the sale of individual mills and converting operations continue this year. Such transactions would be similar in scope to Georgia-Pacific's sale of mills and corrugated plants to Packaging Corp. of America, Boise Cascade Corp.'s sale of its Vancouver, Wash., mill to Appleton Papers Inc., and Federal Paper Board Co.'s sale of its folding carton plants, which all occurred last year.

TABLE 2: **Industry operating rates (%).**

Paper	1986	1987	1988	1989	1990e
Newsprint	97.0%	97.3%	97.8%	96.7%	95.8%
Uncoated groundwood	91.4	90.6	95.7	93.0	90.1
Coated paper	92.9	93.1	94.0	92.0	93.2
Uncoated free-sheet	94.4	95.4	94.8	91.6	94.7
Bristols	96.6	97.5	96.2	97.3	95.0
Thin paper	79.2	82.8	85.0	87.2	83.3
Cotton paper	79.2	82.3	83.3	79.7	81.2
Packaging and industrial	88.9	90.2	93.3	90.5	85.8
Tissue	93.1	96.3	96.6	97.2	96.7
Total paper	**93.2**	**94.2**	**95.4**	**93.2**	**93.4**
Paperboard					
Kraft linerboard	95.5	98.5	95.7	94.1	95.5
Other kraft	88.9	86.5	79.5	85.1	81.0
Total	**95.0**	**97.3**	**94.4**	**93.4**	**94.3**
Semichemical	96.7	97.4	97.8	98.4	97.1
Bleached board	93.3	94.2	95.3	95.8	96.5
Recycled	89.7	92.8	92.2	91.0	87.5
Total paperboard	**93.8**	**96.2**	**94.5**	**93.8**	**93.3**
Total paper and paperboard	**93.5**	**95.1**	**94.9**	**93.4**	**93.2**

Source: American Paper Institute and *Pulp & Paper* estimates.

TABLE 3: **Industry production (000 tons).**

Paper	1986	1987	1988	1989	1990e
Newsprint	5,630	5,482	5,982	6,088	6,548
Uncoated groundwood	1,540	1,498	1,624	1,743	1,734
Coated paper	6,263	6,860	7,359	7,215	7,493
Uncoated free-sheet	10,410	10,966	11,277	11,081	11,507
Bristols	990	1,052	1,150	1,163	1,190
Thin paper	247	240	281	245	225
Cotton paper	152	163	169	161	164
Packaging and industrial	5,117	4,955	5,033	4,916	4,694
Tissue	5,095	5,301	5,476	5,636	5,779
Total paper	**35,444**	**36,676**	**38,351**	**38,248**	**39,334**
% change	**4.3%**	**4.0%**	**4.0%**	**−0.3%**	**2.8%**
Paperboard					
Kraft linerboard	16,402	17,683	17,897	18,056	18,727
Other kraft	1,287	1,215	1,244	1,434	1,399
Total	**17,689**	**18,898**	**19,140**	**19,490**	**20,126**
Semichemical	5,376	5,536	5,664	5,691	5,679
Bleached board	4,271	4,406	4,511	4,521	4,457
Recycled	8,083	8,601	8,789	8,754	8,776
Total paperboard	**35,419**	**37,442**	**38,105**	**38,456**	**39,038**
% change	**7.2%**	**7.2%**	**1.8%**	**0.9%**	**1.5%**
Total paper and paperboard	**70,863**	**74,318**	**76,456**	**76,704**	**78,372**
% change	**5.7%**	**4.9%**	**2.9%**	**0.3%**	**2.2%**

Source: American Paper Institute, *Pulp & Paper* estimates.

In 1990, the sale of corrugated container plants accounted for the greatest number of transactions in the industry.

The only feasible transactions are strategic acquisitions that have value to both buyer and seller, says Chao of Salomon Brothers. For example, companies having a weak balance sheet may be forced to sell noncore businesses to financially strong companies seeking growth. However, capital available to fund acquisitions is scarce as both cash flow and financial markets have declined during the past year. Additionally, the weak pricing outlook for the industry has discouraged financing for some deals. Last year, both Media General and Kimberly-Clark Corp. were unable to sell newsprint mills because potential buyers failed to secure sufficient financing.

NO DIVIDEND CUTS. Despite the moderately pessimistic outlook for the industry this year, most analysts do not expect paper companies to significantly reduce their stock dividends, which generally represent 10% to 15% of cash flow. A few highly indebted companies could face a critical financial squeeze if the economic downturn this year is deeper or longer than predicted and their creditors could force a dividend cut, says Lynn of Dean Witter Reynolds. But generally, she does not foresee a widespread reduction in dividends.

Chao of Salomon Brothers expects only three paper companies not to earn their dividend this year, but only two of these companies face the real prospect of having to cut their dividend. This contrasts with the 1980-82 recession during which eight companies cut their dividends. He foresees few companies facing this grim scenario during this cyclical downturn because companies resisted the temptation to raise dividends too aggressively when earnings were at record highs. He comments that five of the eight companies that cut dividends during the 1980-82 recession—Crown Zellerbach, Diamond International, Pacific Lumber, Southwest Forest Industries, and St. Regis—are no longer independent companies. As far as investing in paper company stocks, most analysts advise caution and are not recommending the stocks to their clients.

Uncoated free-sheet

Uncoated free-sheet still lively

■ Nearly 1 million tons of new capacity and an economic downturn are likely to adversely affect the uncoated free-sheet paper markets, though analysts say that many mills will still make money.

Resource Information Systems Inc. vice president John Maine estimates that uncoated free-sheet mills will experience lower operating rates because of increased capacity, but mills should still remain at utilization rates of 90% or above for the next five years, Maine said. Paper demand will advance about 2.9% this year, compared with a GNP of less than 1%.

Analysts at Morgan Stanley & Co. agree, predicting that operating rates will average 92.2% this year, slightly down from the estimated 93.4% of 1990 but still somewhat healthy. At the same time, capacity is increasing 5%, according to the American Paper Institute. Morgan Stanley suggests that consumption will rise slightly more than 3% and prices by 3.5% this year compared with 1990, when prices actually declined an estimated 1.8%.

New capacity onstream by the end of 1991 will include the following: Boise Cascade Corp., 300,000 tpy, International Falls, Minn. (late 1990); Willamette Industries Inc., 255,000 tpy, Bennettsville, S.C. (September/October 1990); Georgia-Pacific Corp., 325,000 tpy, Ashdown, Ark.; and Union Camp Corp., 240,000 tpy, Eastover, S.C. (1991). Federal Paper Board Co. is considering its first uncoated free-sheet printing/writing paper machine for Augusta, Ga.

Because the recycling issue isn't going to go away, many mills in 1990 introduced recycled uncoated free-sheet grades. However, mills will have to deal with governments trying to develop stricter guidelines for definitions of recycled paper, meaning that some will consider installing their own deinking plants. Also, the number of mills converting to alkaline-based paper continues to grow, with some 43 mills now producing it. The lower costs and potential increased marketability to some end uses may help offset some of the fears in this recession year.

CUT-SHEET GROWTH CONTINUES. High growth in cut-sheet paper used in computer printers will help raise demand by about 6.5% annually through 1994, according to BIS CAP International. Cut-sheet demand in the U.S. will post a compound annual growth rate of 6%/year, while in Canada the rate will be 7% in the 1989-94 period. International Business Forms Assn. forecasts stock continuous forms to continue to be the strongest growth area of the major forms products, with 3.4% real average annual growth in sales from 1990 to 1991.

BIS CAP said that total cut-sheet paper for printers, copiers, typewriters, and duplicators will rise from almost 3.2 million tons in 1989 to 4.3 million tons in 1994. About 53% of that tonnage will be used in copiers, with about 41% for computer printers.

Growth in cut-sheet paper for computer printers will advance 16%/year, and 4% for copiers. Cut-sheets used in typewriters and duplicators will decline substantially over the five-year period.

Basepaper for thermal and other specialty uses related to electronic data transmission and printouts will perform much better than both cut-sheet and forms markets, according to BIS CAP. For instance, demand for thermal paper in the U.S. will rise from almost 33,000 tons in 1984 to 107,000 tons in 1994—a 27% compound annual growth rate.

Coated paper

Coated mills to post few gains

■ Addition of 800,000 short tons of new coated free-sheet paper capacity, the recession, and the tightening of credit could all hurt coated paper producers this year, though product prices are not expected to decline as much as they did in 1990.

Even so, Morgan Stanley & Co. estimates that operating rates for coated mills will nudge up to 90.6%, after being under 90% for two years. This is based on a capacity increase of 4.8% over last year. However, actual profits will fall, perhaps 23.5% after a loss of 38.4% in 1990, Morgan Stanley predicted. Overall demand growth for coated paper will average 4% to 5% this year, according to forecasts by Resource Information Systems Inc. That forecast is still optimistic, considering the recession. But RISI vice president John Maine forecasts operating rates at 87%. Jaakko Pöyry Consulting projects the following operating rates: U.S. coated free-sheet mills, 86.6%; Canadian coated free-sheet, 88.4%; U.S. coated groundwood, 95.3%; and Canadian coated groundwood, 95.6%.

Jaakko Pöyry foresees Canadian domestic consumption of coated free-sheet paper rising just 2% in 1991 from 1990, while U.S. consumption will advance almost 9%, to just under 4 million tons. Canadian coated groundwood consumption could increase upwards of 9%, and U.S. customers will consume slightly less than 6% more, according to Jaakko Pöyry figures.

Maine said the strongest growth will be in advertising inserts and other commercial printing, followed by catalogs and magazines. The most energetic demand will be for the higher grades, Nos. 1 through 3, where much of the new capacity is focused.

Growth in coated imports will slow this and next year because of the economic situation, because there is no new announced coated capacity in Canada, and because new U.S. coated free-sheet capacity will be available, Maine said. New capacity this year will include a 125,000-tpy conversion at Westvaco Corp.'s Wickliffe, Ky., mill and Consolidated Papers Inc.'s 212,000-tpy coated free-sheet machine at Wisconsin Rapids, Wis. The only current coated groundwood project is that of Boise Cascade Corp. at Rumford, Maine. However, that 308,000-tpy project has been delayed until 1994.

Jaakko Pöyry's Dan Temple said that with the continued delay in new North American coated groundwood capacity and increasing coated groundwood capacity in Europe, U.S. imports of coated groundwood paper from Europe are likely to rise above current projections, which were expected to remain flat this year at 350,000 short tons from non-Canadian sources. Canadian exports of coated groundwood grades to the U.S. may rise slightly less than 7%. Coated free-sheet imports are expected to rise just under 6% from all sources.

Coated papermakers are closely watching the retail/catalog and publishing sectors, which are likely to continue turning downward as the recession continues.

For example, magazine advertising pages for the nine-month period from January through September 1989 were off 3.3% compared with 1989, according to the Publishers Information Bureau. Brian Vergin, senior vice president of marketing for Blandin Paper Co., a producer of coated groundwood grades, told a company publication that he believes "a good number of magazines will disappear." Most major magazines have suffered circulation declines, and both Canadian and U.S. publishers face postal rate increases this year. General overcapacity and high publisher inventories exist.

The good news so far is that paper list prices have not fallen, but there are discounts. Morgan Stanley expects coated paper prices to rise 0.5% this year, compared with an average price decline of 2.9% in 1990.

Tissue

New capacity braves slower growth in demand

■ Slower economic growth will hold down gains in demand for both consumer and commercial and industrial (C&I) tissue in 1991. Demand is expected to grow at roughly 1% this year, the slowest gain since 1985, and mills will operate at rates around 94% to 95%. The weakening economy could reshape demand, driving consumers to use lower-price tissue, hurting up-scale producers. Private-label products also do better under these conditions. And people eat out less in an economic dip, damping the demand for C&I tissue.

On the whole, both the consumer market and the C&I business are quite stable now. Tissue firms realized a 3% or so price hike on consumer tissue by mid-1990, though the introduction of Kimberly-Clark Corp.'s Kleenex bath tissue late in the summer led to some promotional activity in the South. The industry's 5% across-the-board price hike in away-from-home tissue planned for late fall was moving into place toward year end and will probably result in a 3% rise. In 1991, analysts expect overall tissue prices will go up 2% to 3%, including some carryover from last year's hikes and a possible rise in second-half 1991.

NEW CAPACITY AHEAD. The tissue industry is planning a flurry of new projects, though some analysts believe a few of the announcements are simply posturing by the industry. Among the potential projects is a new $200-million mill being planned by Scott Paper Co. on the Ohio River in Indiana or Kentucky. Along with some other investments, this project should release the firm from the need to buy tissue paper. Construction should begin in 1991.

Fort Howard expects a mid-1991 startup for a fourth tissue machine at its Savannah River mill in Rincon, Ga., raising the mill's 100%-recycled tissue capacity 30%, or 225 tpd. Output will find its way primarily to

the C&I market. Potlatch Corp., which claims the premier position in private label and generic tissue products in the U.S., plans to start up a new tissue machine and shut down an old one at its Lewiston, Idaho mill by 1992. The $95-million effort will bring mill capacity to 124,300 tpy, up from 85,700 tpy.

Kimberly-Clark introduced its first baby wipes product in California in fall 1990. Baby wipes comprise a $350-million market at the retail level in the U.S., according to a K-C spokeswoman, and the sector is growing 5% to 10%/year.

The firm also put up a C&I tissue mill in Loudon, Tenn., that reportedly went online in August 1990. And the firm's new Jenks, Okla., facility is being dedicated to K-C's reentry into the U.S. consumer bath tissue market. The plant started up in April that year and has capacity for 68,000 metric tpy of consumer tissue. The 100%-virgin fiber tissue was initially being sold in the southern and central U.S.

Competitors did not sit back quietly, however. For example, Procter & Gamble Co. reportedly responded with a very aggressive price on its own bath tissue. And P&G is continuing its expansion in the consumer toilet tissue and paper towel market. It plans to pump about $250 million into two new paper machines at an existing P&G plant east of the Rockies. Engineering studies for the project should be complete by the end of 1991. The firm is also planning a $100-million tissue and towel expansion that could include a new machine in California, possibly in Oxnard.

TABLE 4: **North American tissue expansions.**

Startup date	Company	Site	Annual capacity (short tpy)
1989	Vicell Canada Tissue Ltd.	Delta, B.C.	9,900
1989	FSC Paper Co.	Alsip, Ill.	70,000
1989	Atlas Tissue Mills	Hialeah, Fla.	15,000
1989	Irving Tissue Co.	St. John, N.B.	60,000
1989	Fort Howard Corp.	Rincon, Ga.	91,000
1990	Atlantic Packaging Products Ltd.	Whitby, Ont.	30,000
1990	Kimberly-Clark Corp.	Loudon, Tenn.	n.a.
1990	Kimberly-Clark Corp.	Jenks, Okla.	75,000
1990	Cascades Inc.	Kingsey Falls, Que.	28,000
1990	Wisconsin Tissue Mills	Menasha, Wis.	80,000
1990	Putney Paper Co., Inc.	Putney, Vt.	5,000[1]
1990	Procter & Gamble Paper Products Co.	Green Bay, Wis.	n.a.
1991	Perkins Papers Ltd.	Candiac, Que.	28,000
1991	Fort Howard Corp.	Rincon, Ga.	91,000
1991	Consumers Paper & Supply Corp.	Calgary, Alta.	28,000
1992	Potlatch Corp.	Lewiston, Idaho	39,000[2]
n.a.	Scott Paper Co.	n.a.	n.a.[3]
n.a.	Procter & Gamble Paper Products Co.	n.a.	n.a.[4]
n.a.	Mosinee Paper Corp.	Middletown, Ohio	n.a.[5]
n.a.	James River Corp.	Old Town, Maine	n.a.
n.a.	James River Corp.	Naheola, Ala.	n.a.

n.a.=not available.
1. Estimated capacity addition from rebuild.
2. Net capacity addition.
3. Scott Paper approved an expansion, including a $200-million greenfield mill and rebuild of an idle machine.
4. Procter & Gamble plans an expansion valued in excess of $100 million, including at least one new machine in California; $250 million will also be invested in two new machines at an existing mill east of the Rockies.
5. Mosinee Paper is putting $50 million into a new tissue operation.

Source: *Pulp & Paper.*

Containerboard

Strong exports will help market

■ U.S. linerboard producers were unsuccessful in pushing through a $30/ton price increase to $410 in the eastern U.S. last October even though market conditions were relatively favorable. Linerboard and even semichemical medium mills were generally running full, and containerboard inventories remained at low levels due to continuing modest growth in domestic corrugated box cutup combined with surging linerboard export shipments. U.S. linerboard exports were expected to be up about 16% in 1990 to nearly 2.9 million short tons, surpassing the previous record of 2.5 million tons set in 1980 (based on Dept. of Commerce data).

But now analysts are wondering whether the industry can simply hold linerboard transaction prices at around their current $360 to $370/ton level if the economy—and corrugated box demand—begin to weaken, particularly with the market in the seasonally slow winter period. One bright spot continues to be U.S. linerboard exports, which are expected to remain strong due to the weak dollar even with slower economic growth in Western Europe and Asia. The strength in exports is expected to help prevent a collapse in prices and profits such as experienced by the industry in 1985.

"U.S. containerboard producers will be saddled with slack market conditions through the summer of 1991," Rodney Young, president of Resource Information Systems Inc., told last November's 4th International Unbleached Kraft Conference in New Orleans, La. He said U.S. corrugated box shipments were likely to show a flat performance at best during the first half of 1991 if the U.S. economy drops into a mild recession.

At the same time, substantial new linerboard capacity will be entering the market from three new machines. Gaylord Container Corp. started up a 357,000-tpy machine at its Bogalusa, La., mill last June, while Mead Corp. will be producing some linerboard from its new 375,000-tpy coated kraft board machine at Mahrt, Ala., which began production last September. Union Camp will be adding about 235,000 net tpy of capacity with the startup of a new machine at its Savannah, Ga., mill in the first quarter of this year.

This additional capacity will cause U.S. linerboard mill operating rates to drop to average 91% in the first half of 1991, the lowest point of the current cycle, according to Young. He believes, however, that U.S. linerboard producers will be able to start restoring profit margins in second-half 1991. "A cyclical upturn in the

Columbia and then a revival of world economic growth in the second half of the year. Any prolonged labor disruption in British Columbia, which accounts for about 15% of total world supply, would probably result in a temporary lift for the market. Yet most analysts expect the pulp market to remain under pressure over the next several years due to substantial new capacity additions. World paper pulp capacity is expected to rise at about a 4%/year rate over the next several years, with the biggest bulge of 1.9 million tons coming in 1991.

Among major new bleached kraft pulp projects coming onstream in North America have been Weyerhaeuser Paper Co.'s new 425,000-tpy mill at Columbus, Miss., and Daishowa Canada Co. Ltd.'s new 350,000-tpy mill at Peace River, Alta., both of which started up last year. And three new bleached chemi-thermomechanical pulp mills will be starting up in Canada in late 1990 or early 1991 with a combined capacity of about 450,000 tpy. The heaviest expansion activity this year will shift to Latin America, where Aracruz Celulose SA will be starting up the 525,000-tpy addition to its Brazilian mill in the first quarter. And Cellulose Santa Fe (Scott Paper and Shell) will be starting up a 240,000-tpy eucalyptus mill in Chile.

Rodney Young, president of RISI, expects the pulp market to "record a solid three-year upswing beginning in 1991 due to a cyclical reacceleration of the world economy." Pulp demand will be helped by above-average growth in printing/writing and tissue paper. However, he believes demand will be inhibited by potentially high prices for northern softwood, integrated pulp capacity expansion, and rising wastepaper usage.

Nevertheless, the upswing in pulp demand is "not expected to result in return to very tight market conditions in the first half of the 1990s due to the large announced capacity expansion round." He projects operating rates for world paper-grade market pulp rising from 86% in 1990 to 87% in 1991 and then to 92% by 1993. He believes the next peak in industry profit margins will be 20% to 30% below the 1989 peak, with a significant differential in profitability between softwood and hardwood pulp.

How far will prices fall? "Over the last four downcycles, prices have fallen until they were about $10/ton below the variable manufacturing cost of the portion of production needing to be curtailed in order to balance supply and demand," noted Allen Whitman of Whitman Associates in a recent issue of *PaperTree Letter*. Therefore, prices would probably bottom close to $600 for northern softwood and the low- to mid-$400 range for hardwood, based on several estimates of industry costs and taking into account more recent decline in the dollar. "Some producers will make a little money at these prices," he said. "Most will not."

"The 1990s will be one of the most rapidly changing decades in the market pulp business," according to Kenneth Lowe in a recently completed *Pulp & Paper Forecaster* study, "Market Pulp in the Competitive '90s."

Labor

Quiet in the U.S., tumult in Canada

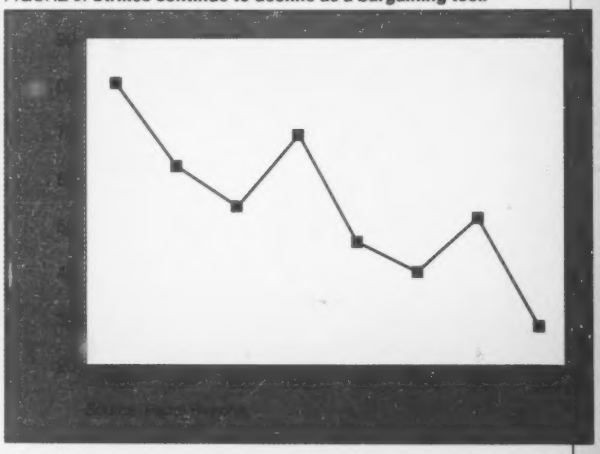
■ In 1989, Stone Container Corp. CEO Roger Stone warned Canadians that free trade between the U.S. and Canada would reveal some of the cost excesses of Canada's paper industry, most noticeably, its higher labor costs and lower productivity. Stone said that to become more competitive, Canadian paperworkers would need to start accepting wage and benefit increases commensurate with those in the U.S. In a showdown last year between the CPU and Stone's Montreal, Que., subsidiary, Stone-Consolidated Inc., however, Canadian workers walked away with an annual wage hike of 5.5%, significantly above the average for members of the United Paperworkers International Union (UPIU) and the Assn. of Western Pulp & Paper Workers (AWPPW) in the U.S.

Negotiations last year in both countries further pointed out the differences between U.S. and Canadian labor. Relative peace in U.S. contract negotiations came at the expense of continued concessions to company cost-cutting measures, while strikes raged through the summer and fall throughout eastern Canada as workers opposed controversial contract provisions.

Looking ahead to 1991, it appears that workers in Canada's western industry are geared to fight for similar wage and vacation pay hikes that were achieved by eastern workers last year, while U.S. workers struggle to oppose continued management demands for moderate wage hikes, the elimination of premium pay, and cutbacks in health coverages.

Contract negotiations involving about 80 U.S. pulp and paper industry locations are scheduled to come up during 1991, and companies are expected to continue to pursue cost-containment measures, especially in health care coverages. Health insurance expenses have been rising almost double the general rate of inflation. Aver-

FIGURE 5: **Strikes continue to decline as a bargaining tool.**



age annual health plan costs per employee come to about $2,350, and this will lead paper companies to put the control of health insurance costs at the top of their bargaining agenda in the coming year. Other trends that are expected to continue from last year are the declining use of lump-sum payments in substitution of a first-year wage increase and a dramatic increase in four- and five-year contracts.

The number of strikes in the U.S. pulp and paper industry continues to decline, with three occurring last year and one strike in 1989, compared with 19 in 1983 and 16 in 1986. While several mills remain under implemented contract provisions in the absence of a ratified agreement, 1990 appeared to be a generally conciliatory year in the U.S., with long-term contracts reached at several major facilities. The threat of striking workers being permanently replaced by temporary employees continues to loom over the unions, especially since the International Paper Co. strikes of 1988; but in over 115 strikes since 1980, only a handful of mills have actually replaced their union work forces. Unions seem limited by the ability of a company to operate its mill using salaried personnel, which occurred in two U.S. strikes last year.

LUMP-SUM PAYMENTS DECLINE. The elimination of Sunday premium pay for paper workers continued through 1989 and 1990, with over 100 mills having cut the policy by the middle of last year. AWPPW said it has yet to ratify a contract that eliminates Sunday premium pay, although union members are working under implemented contracts that contain the provision. While market pressure increases on other mills to follow suit, companies that have already eliminated Sunday premium are now attempting to cut costs by redesigning work practices and job descriptions.

The lump-sum practice was beneficial for companies both in maintaining a lower base wage and in reducing the multiplied effect on benefits and pensions in any one year. At some facilities, a general wage increase was replaced by a percentage increase based on W-2 earnings. Some mills were able to eliminate holidays and shift differentials. On the surface, average first-year wage increases went up in 1990 to 2.4% compared with 1.1% in 1989, but the low 1989 figure was due to the proliferation of lump-sum payments, which sometimes amounted to 3% of annual wages, noted industry labor consultant Julian Kien.

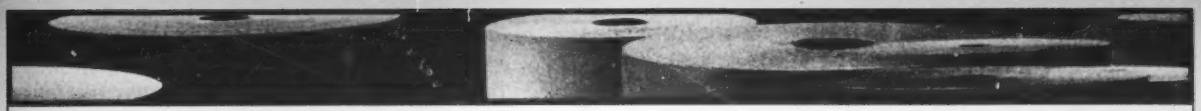
"In the last year, we held our own," said a UPIU executive. "The gains were not what we would consider to be fair, but it was an improvement." He emphasized improved attitudes among certain companies, namely Scott Paper Co. and James River Corp., two major producers who established high-level labor management committees with UPIU.

"We've developed a working relationship with them, and it is reflected at the bargaining table," the UPIU executive said. Companies such as International Paper Co. and Georgia-Pacific Corp., however, still draw the ire of union officials. "Unfortunately, things haven't improved

TABLE 5: **Canadian Paperworkers Union strikes, 1990.**

Company/mill	Grade	Capacity (metric tpy)	CPU Local No.	Number of workers	Dates of strike
James Maclaren Industries Inc.					
Masson, Que.	Newsprint	200,000	11	420	7/26-8/27
Quebec & Ontario Paper Co.					
Baie Comeau, Que.	Newsprint	450,000	352/375	1,200	7/28-8/27
Thorold, Ont.	Recycled News	310,000	35/41/101	530	8/14-12/18
Abitibi-Price Inc.[2]					
Thunder Bay Div.[3]	Newsprint	161,000	132/134/249	515	9/10-10/9
Fort William Div.[3]	Newsprint	141,000	—	—	9/10-10/9
Provincial Papers[3]	Coated	170,000	40/239	750	9/10-10/9
Iroquois Falls, Ont.	Newsprint	263,000	90/109	690	9/10-10/9
Chandler, Que.	Newsprint	208,000	162/858/455	530	9/10-10/9
Stephenville, Nfld.	Newsprint	166,000	1093	260	9/10-10/9
Grand Falls, Nfld.	Newsprint	196,000	59/63/88 158/161	740	9/10-10/9
Canadian Pacific Forest Products Ltd.					
Gatineau, Que.	Newsprint	525,000	142/251	1,255	9/12-
Dalhousie, N.B.	Newsprint	302,000	146/164/263	835	9/12-
Thunder Bay, Ont.	Newsprint	400,000	39/257	1,760	10/11-
	Kraft pulp	454,000	—		
Repap Enterprises Corp.					
Newcastle, N.B.	Coated	300,000	689	850	11/24-11/30
	Kraft pulp	60,000	—	—	
Irving Pulp & Paper Ltd.[4]					
Irving Tissue/St. John, N.B.	Tissue	67,500[5]	786	105	3/29-5/25
Rothesay Paper/St. John, N.B.[6]	Newsprint	322,000	601	450	4/9-

1. Strikes through Dec. 15, 1990.
2. Company laid off nearly 1,000 woodworkers following strikes.
3. Located in Thunder Bay, Ont.
4. Strikes not related to CPU pattern negotiations.
5. Includes new 150-tpd tissue machine, started up November 1989.
6. Company operated one of two machines (450-tpd) following strike.



one iota with IP," the union leader said. "And G-P and Stone Container are still in the same position. There are no realistic proposals."

ATTEMPTS TO REGAIN POWER. Although pooling does not have a successful history in the U.S. paper industry, UPIU employed this tactic again during its 1989-90 bargaining involving 6,000 workers of Champion International Corp. at seven locations. In early 1990, UPIU established a pool among 25 locals of International Paper, saying it expected the IP pool to grow to 100 locals by late-1991. In addition, AWPPW has several multi-mill "units" in the Northwest. But the National Labor Relations Board has consistently ruled against attempts at coordinated bargaining so far.

Average first-year wage increases of 2.4% in the U.S. continue to be below the 3.0% average of the U.S. manufacturing sector and well below annual wage hikes of 5.5% achieved by Canadian industry workers. Analyst Kien noted that labor agreements in the U.S. are becoming longer, with 60% of pacts in the first nine months of 1990 being for four or more years. In 1987, 10% of contracts were for four years or more. Of the 62 mills that settled through October 1990, one-third did so for five or more years. The long-term impact of contract extensions will be moderation in wage escalation as those increases in 1992 through 1994 continue at established levels and the accords create a stable work environment in the face of the industry's cyclical downturn, Kien said.

CANADA WRACKED WITH UNREST. With the Canadian paper industry already reeling from poor markets and the onslaught of the 1990 recession, contracts expired Apr. 30 for almost 35,000 paper industry workers in the eastern provinces. Most workers are members of CPU, although the French Canadian union, La Fédération des Travailleurs du Papier et de la Forêt (FTPF), represents 14,000 workers in Quebec. CPU and its target company, Stone-Consolidated, hammered out a compromise "pattern" contract in July that provided an attractive pay hike and vacation pay raise for workers but also allowed the company flexibility with job descriptions and the ability to operate its mills on two statutory holidays. But those provisions were considered "local issues" by CPU leadership, and the union pledged its support to any local that opposed those concessions. CPU was already on strike at Irving Pulp & Paper Ltd.'s Rothesay Paper newsprint mill in St. John, N.B., precisely over flexible trades and vacation pay issues. Maintenance workers at Rothesay struck Apr. 10, 1990, while the CPU local representing paperworkers was forced back to the job by court order. Pulp and tissue workers across the street had also struck but established a contract by May 25. The schism in St. John was a microcosm of later developments in the pattern contract negotiations that saw workers in one mill oppose items accepted by workers in another. Following the Stone settlement, scattered strikes occurred in Quebec, eventually leading to a walkout by over 3,500 workers at seven Abitibi-Price Inc. mills in three provinces. By late September, about 23% of Canada's newsprint capacity was shut down in strikes at 11 mills. Workers were also disenchanted by the lack of gains in job security and cost of living allowances.

The strike against Abitibi ended Oct. 9 when the company and union compromised on the two most contentious issues. Identical to the Stone-Consolidated pattern, the Abitibi contract called for a pay hike of 85¢ in the first year and 5.5% in each of the next years, lifting wages 16.5% by 1992, an increase in take-home pay of $11,000 on the average. Vacation pay was lifted to 2.4%, a 20% improvement, while workers granted the company increased flexibility in assigning work to maintenance employees and tradesmen. But unlike the pattern deal, Abitibi would need the permission of its union locals in order to operate its mills on statutory holidays, and the union won job security language that is designed to protect workers in the event of machine and mill shutdowns that could lead to the loss of jobs.

But many union workers remained vehemently opposed to the flexibility and holiday provisions, and new strikes occurred at Canadian Pacific Forest Product Ltd.'s Thunder Bay, Ont., pulp and paper mill and Repap Enterprises Inc.'s Miramichi paper and pulp mills in Newcastle, N.B. The tumultuous bargaining season in the East last year could repeat this year as labor contracts expire for about 18,000 western Canadian paper and pulp workers on July 1.

Environment

Clean air, dioxin are dominant concerns

■ In spite of the attempt to make pulp and paper mills more environmentally sound, the public remains leery about the industry, and government is attempting to exert more control over it. Dioxin—generated by bleaching pulp with chlorine—and clean air issues have been in the forefront in the U.S., while Canada has focused on developing national regulations on mill effluent.

WATER. In mid-1990, EPA announced that dioxin levels in finished paper products had been cut to the point where they were just about safe, though it asked the Food & Drug Administration to take responsibility for further lowering the "already low risks" tied to the presence of dioxin in food packaging. However, EPA indicated there was still a way to go in reducing dioxin in production waste to acceptable levels. And the agency considered the consumption of fish downstream from pulp mills a very real hazard, saying it planned to "greatly lower dioxin discharges into those waters." EPA has suggested a limit on dioxin in streams of 0.013 parts per quadrillion (ppq), even though technology is not yet available to detect such low residues. However,

Capital Spending Plans: 1990-92

After two years of record increases, the capital spending boom will begin to play out in 1991

By CARL ESPE, News Editor

Paper industry capital spending has boomed for the past two years, but the slowdown in business that began last year will lead to a slowdown in investment this year in both the U.S. and Canada. In *Pulp & Paper*'s annual year-end survey of spending plans, U.S. companies reported plans to spend $17.0 billion on mill improvements over the 1990-92+ period, down 5.5% from plans reported at this time last year for 1989-91.

The downturn is more pronounced in Canada, where pulp and paper companies now report plans to spend C$10.2 billion on mill improvements over the 1990-92 period. That total is down 21.1% from plans reported last year for 1989-91. Canadian companies have been battered by weak markets for newsprint and pulp, their major commodities, and by a strong currency that cuts into sales recorded in U.S. dollars.

Projects for startup in 1990 account for $7.1 billion of overall U.S. spending plans. So far, announcements total $5.7 billion for 1991, $2.4 billion for 1992, and $1.4 billion for 1993. This pattern of progressively lower outlays is more evidence for a downturn in spending, since the past few strong years have followed the opposite pattern. Projects completed in 1990 account for C$4.6 billion of the Canadian total. Thus far, companies have announced plans to spend C$3.2 billion on projects for startup in 1991, C$1.4 billion in 1992, and C$967 million in 1993 and beyond.

The backlog of "proposed" projects—under active consideration but not yet approved—has risen to $7.3 billion in the U.S., up over 25% from last year. This total includes several speculative projects that are seeking financing, however, and it is doubtful that some of them will be approved during the current slump. Mechanical pulp mill proposals in particular appear unlikely to proceed because of weak markets. Proposed projects in Canada account for a potential C$6.9 billion in new spending, up over 60% from last year's backlog of C$4.3 billion. As in the U.S., however, this total includes several projects unlikely to be approved anytime soon.

While investment plans are definitely being scaled back, it is worth noting that spending will remain very high in historical terms. Outlays planned in the U.S. for 1990-92 are twice as high as for 1987-89 and over 65% greater than 1981-83, the peak of the last capital spending cycle. While the year-over-year percentage figures are down, spending remains high in absolute terms.

ENVIRONMENTAL PROJECTS LEAD THE WAY. Environmental improvements have replaced capacity expansion as the driving force behind spending plans. At existing mills, environmental projects now account for 11.1% of total spending in the U.S., up from 6.9% last year and 5.0% two years ago. In Canada, environmental projects account for 24.9% of planned outlays, up from 15.9% at the beginning of 1990 and 5.5% the year before that. Most of this increased spending will go toward reducing dioxin formation, installing secondary treatment facilities, and controlling odor at kraft pulp mills.

Capacity expansion will remain high in 1991 but will tail off rapidly next year as the boom plays out. Major capacity additions for coated and uncoated free-sheet are coming online this year and next, and a cycle of above-average growth in newsprint will be largely completed this year. Looking ahead, capacity growth will be strongest in recycled grades, including tissue, newsprint, and containerboard. Deinked pulp installations are booming thanks to legislated demand for recycled-content paper, and the major tissue producers are gearing up for a period of above-average capacity expansion.

Record capacity expansion is the main reason investment plans shot through the roof two years ago—and why they will remain relatively high at least through 1991. In the U.S., capacity expansion will peak this year with a 3.8% increase, the largest in over 25 years. In Canada, severe cutbacks in expansion activity will still allow for annual growth over the next two years well above the rate of the previous ten years. As the capacity expansion boom winds down, however, spending will drop as well. Planned outlays for new paper machines in the U.S. totaled $4.7 billion in the latest survey, down 9.1% from last year. Spending plans for new mills dropped from $3.3 billion in last year's survey to $3.1 billion this year, a decline of 6.7%. In Canada, outlays for new paper machines are expected to total C$1.3 billion over the 1990-92 period, down 46.5% from last year. Spending for new mills will fall 25.4% to C$2.4 billion.

ABOUT *P&P*'S ANNUAL SURVEY. Now in its twenty-seventh year, *P&P*'s annual capital spending survey cov-

ers expansion and modernization programs at U.S. and Canadian mills. Unlike surveys that track spending by year, *P&P*'s survey covers spending by project. Dollar figures represent the total cost of reported projects and often include supporting equipment. The total cost of multiyear projects is assigned to the startup year and is not divided among the years of expenditure. Each survey primarily covers a three-year period—the current survey covers 1990-92, but projects with firm startup dates beyond that time frame are also included. ■

UNITED STATES

RECYCLING AND ENVIRONMENTAL IMPROVEMENTS LEAD SPENDING PLANS

■ After six consecutive years of record outlays, U.S. pulp and paper companies have trimmed their capital spending plans for 1990 and beyond in the face of deteriorating profits and sluggish growth. Companies have invested heavily over the past several years to expand capacity, cut costs, improve product quality, and meet environmental standards, but the spending boom appears to have peaked in 1990.

Solid evidence for a slowdown began to appear early last year, as companies lowered their 1990 capital plans. In late 1989, the industry reported plans to spend $17.92 billion on capital projects in 1990, according to the Census Bureau. But in April 1990, that figure had fallen by about $200 million, or 1.1%, from the earlier forecast. A downward revision of 5.1% in planned outlays for the second quarter was responsible. While the Census Bureau revised its forecast up by 0.9% in September, further downward revisions are likely this year as the industry responds to slower demand, excess capacity in some grade segments, and reduced profitability.

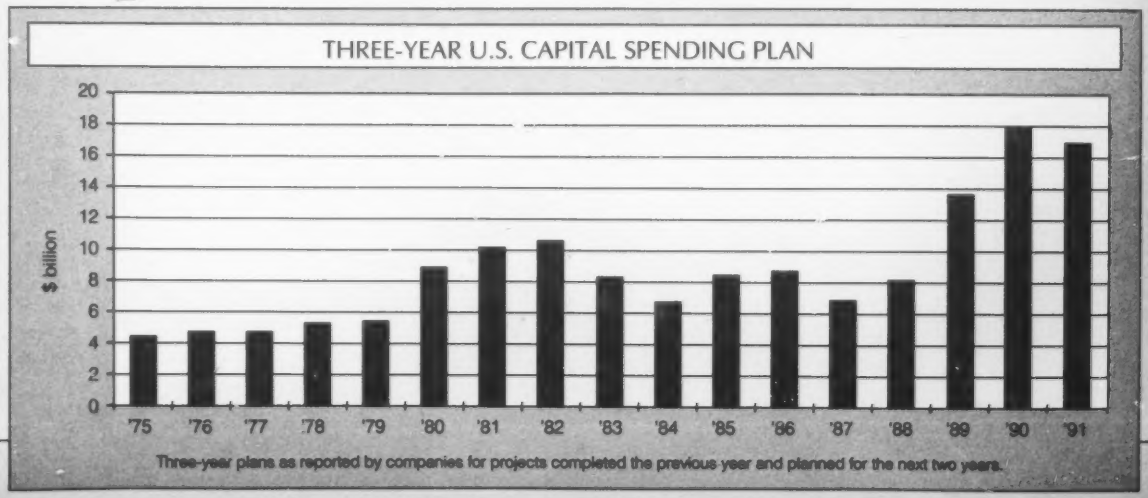
In *P&P*'s end-of-year survey, U.S. companies reported plans to spend $17.0 billion on projects for completion during the 1990-92+ period, a cutback of 5.5% from plans reported a year earlier for the 1989-91+ period. Spending on projects for startup in 1990 was about 10% higher than expected a year ago, but commitments for 1991 and especially 1992 have slowed dramatically. Companies are announcing new projects at about half the rate of the past few years.

Among U.S. companies with the largest capital programs are International Paper Co., Champion International Corp., and Weyerhaeuser Paper Co. Scott Paper Co. plans to spend about $1.4 billion over the 1990-91 period, and while specific spending amounts are not available, Procter & Gamble Co. has announced plans for a major expansion of its toilet tissue and paper towel business. Temple-Inland also plans major mill improvements, focusing on recycled containerboard grades.

After purchasing Great Northern Nekoosa Corp. last year, Georgia-Pacific Corp. plans to reduce debt incurred in the acquisition as rapidly as possible. Analysts report that G-P management is determined to keep capital spending as low as possible during this period, somewhere in the $400- to $500-million range required to cover annual maintenance costs.

James River Corp. announced a major reorganization in August 1990 that will lead to sweeping changes in the company's structure. One consequence of the restructuring will be an increase in capital spending to expand the company's core businesses. The company plans to proceed with a new lightweight-coated groundwood paper machine for St. Francisville, La., as well as modernizing and expanding existing machines at the western business and printing paper mills in Camas, Wash., and Clatskanie (Wauna), Ore. Over the next three years, new tissue machines will be installed at Naheola, Ala., and Old Town, Maine, and existing machines will be expanded and modernized at Naheola and Green Bay, Wis.

SPENDING BY AREA. Production-related expenditures total $15.1 billion for 1990-92, down 9.7% from last year's survey results. Spending for new paper machines is down 9.1% from last year, but outlays for paper machine modernizations and rebuilds are up 3.9%—the



only category to post an increase over last year. Spending for pulp mill improvements, the largest category in dollar terms, is off 3.3% from last year's survey, while woodyard expenditures are down 43.9%. Power plant spending, which has so far been unaffected by the Middle East crisis, is down 22.5% for the 1990-92 period. Reliance on cogenerated power sources built, owned, and operated by outside contractors has played a major role in lowering spending for power generation projects.

Spending for environmental improvements jumped to $1.9 billion in this year's survey, an increase of 51.5% over last year. Three years of increases have pushed environmental spending to its highest level since the 1970s. Higher spending for environmental programs will be necessary over the next several years to comply with more stringent regulation of both water and air pollution. Current spending plans for environmental improvements make up 11.1% of total outlays, up from 6.9% last year but still well shy of the 1970's level.

Combating water pollution remains the industry's highest environmental priority, particularly to limit dioxin formation at bleached kraft pulp mills. Spending plans for water quality improvements total $1.1 billion for 1990-92, up 54.0% from last year. Spending for air quality improvements totals $758 million, an increase of 51.1%. Outlays to handle solid waste total $74 million in this year's survey, up 25.8%. These figures are quite conservative since a significant portion of pulp mill spending is, in fact, driven by environmental considerations.

OVER $6 BILLION FOR PULPING PROJECTS. Pulp mill expansion and modernization projects captured the largest share of spending in this year's survey. Mills reported plans to spend $6.2 billion on pulping projects during the 1990-92 period, or 41% of overall spending. Pulp mill spending accounted for 38% of total outlays in the 1989 survey and 35% the year before.

Capacity expansion, environmental upgrading, and cost reduction are the three most important factors in current pulp mill spending plans. Mills are expanding both market pulp capacity and captive pulp capacity to support more paper and paperboard production. Environmental improvements center on odor control and on reducing chlorine use to limit dioxin formation.

High prices and tight markets made market pulp capacity expansion the driving force behind pulp mill spending in the late 1980s, leading to a number of expansion projects scheduled to come online in the 1990-92 period. Several of these projects are at mills that did not previously produce market pulp.

Four major projects completed in 1990 will add almost 500,000 tpy of bleached kraft market pulp capacity at a cost of over $800 million. In the largest, Weyerhaeuser started up a new 358,000-tpy mill at Columbus, Miss., at a cost of $500 million. Bowater Inc. built a complete new bleached kraft pulp mill at Calhoun, Tenn., at a cost of $205 million. The other two projects improve existing facilities at James River Corp., Camas, Wash., and Louisiana-Pacific Corp., Samoa, Calif.

In 1991, Parsons & Whittemore Inc. will complete construction of a new $700-million bleached softwood kraft market pulp mill at Claiborne, Ala. The Alabama Pine Co. mill will have capacity for 1,250 metric tpd. Stone Container Corp.'s Port Wentworth, Ga., mill will start up a new 740-tpd bleached hardwood kraft market pulp mill as part of a $335-million modernization, and Union Camp Corp. will complete a 105,000-tpy market pulp facility in its $675-million expansion program at Eastover, S.C. Potlatch Corp. plans a new oxygen delignification system and single pulp line to add 45,000 tpy

U.S.—REPORTED CAPITAL EXPENDITURES FOR 1990-92 + BY REGION AND TYPE OF FACILITY ($000)

	PRODUCTION-RELATED EXPENDITURES											
	WOOD/FIBER		PULPING		NEW MACHINES		MACHINE MOD.		ENERGY		MISC./PLANT	
New England	0	0%	321,625	5%	376,000	8%	133,900	5%	245,250	23%	51,125	10%
Mid-Atlantic	0	0%	120,750	2%	125,000	3%	107,198	4%	52,600	5%	4,100	1%
East North Central	11,900	4%	255,941	4%	875,000	19%	416,666	17%	174,250	17%	129,233	25%
West North Central	26,250	9%	195,275	3%	304,575	7%	13,100	1%	38,490	4%	43,860	9%
South Atlantic	74,063	26%	1,801,063	29%	1,482,558	32%	589,325	24%	121,688	12%	109,735	1%
East South Central	126,276	44%	2,364,036	38%	522,818	11%	570,850	23%	286,604	27%	108,216	[illegible]
West South Central	46,135	16%	276,885	4%	590,163	13%	399,400	16%	40,160	4%	48,408	
Mountain/Pacific	0	0%	829,903	13%	394,200	8%	221,350	9%	94,500	9%	18,050	[illegible]
Total	**284,624**		**6,165,478**		**4,670,314**		**2,451,789**		**1,053,542**		**512,727**	

	ENVIRONMENTAL QUALITY SPENDING						TOTALS				
	WATER		AIR		SOLID WASTE		PRODUCTION		ENVIRONMENTAL		GRAND TOTAL
New England	44,670	4%	20,920	3%	9,150	12%	1,127,900	7%	74,740	4%	1,202,640	7%
Mid-Atlantic	15,709	1%	19,907	3%	1,409	2%	409,648	3%	37,025	2%	446,673	3%
East North Central	109,905	10%	20,135	3%	7,785	11%	1,862,990	12%	137,825	7%	2,000,815	12%
West North Central	6,480	1%	6,480	1%	540	1%	621,550	4%	13,500	1%	635,050	4%
South Atlantic	390,176	37%	272,105	36%	27,713	37%	4,178,432	28%	689,994	37%	4,868,426	29%
East South Central	326,994	31%	211,910	28%	18,896	25%	3,978,800	26%	557,800	30%	4,536,600	927%
West South Central	20,820	2%	130,043	17%	7,438	10%	1,401,151	9%	158,301	8%	1,559,452	9%
Mountain/Pacific	140,735	13%	76,850	10%	1,200	2%	1,558,003	10%	218,785	12%	1,776,788	10%
Total	**1,055,489**		**758,350**		**74,131**		**15,138,474**		**1,887,970**		**17,026,444**	

to bleached kraft pulp capacity at Lewiston, Idaho, at a cost of $105 million. A four-year, $408-million modernization at Champion International Corp.'s Courtland, Ala., mill for completion in 1993 includes 250,000 tpy of new bleached kraft pulp capacity.

Plans for new pulp mills in Oregon face environmental challenges that have delayed one project and possibly killed another. WTD Industries Inc.'s permit application for a 300,000-tpy, $420-million bleached softwood kraft market pulp mill to be built at Port Westward, Ore., was denied in 1989, throwing the project into limbo. Pope & Talbot Inc.'s proposed $350-million expansion at Halsey, Ore., is still in the permitting process and has been pushed back from its 1991 target date.

Faced with a solid waste problem that threatens to grow to crisis proportions, over a dozen states are considering or have passed laws mandating increased use of recycled fiber in newsprint and other paper grades. This situation has led to a boom in secondary fiber expansion projects and proposals, as papermakers scramble to position themselves for what promises to be a very different market. At least 14 U.S. newsprint producers are planning to add deinking facilities over the next three years.

While virgin newsprint is suffering the effects of overcapacity, there could be a shortage of recycled newsprint over the next few years. Virtually all North American newsprint producers not using any secondary fiber currently are seriously considering some type of expansion into recycled newsprint—including those that are far away from wastepaper sources, such as Georgia-Pacific's East Millinocket, Maine, mill. Southeast Paper's new 210,000-tpy recycled newsprint machine, started up in 1989, is the sole new newsprint machine among the current crop of expansions to produce recycled grades. Alabama River Newsprint Co., which came online last summer, has announced a plan to install a 360-metric-tpd deinking plant at a cost of $55.6 million to allow production of 40% recycled-content newsprint. Media General Inc.'s Garden State Paper Co. was considering a greenfield mill for the U.S. Northeast, where the landfill problem is most acute, but the project was thrown into limbo by Media General's attempt to sell Garden State. Smurfit Newsprint has approved plans to build a 255,000-metric-tpy recycled newsprint mill in New York but has not announced the location. New recycled paperboard mills have been proposed for the Northeast by Dunkirk Containerboard in New York and Northampton Paperboard in Pennsylvania.

On the West Coast, North Pacific Paper has approved a plan to install a new newsprint machine at Longview, Wash., that includes a deinking facility capable of supplying 25% of overall mill needs. Golden State Paper, which belonged to Garden State Paper until early 1989 and which was recently sold to Jefferson Smurfit, is studying a new recycled newsprint machine for its Pomona, Calif., mill. Also in California, Daishowa America Co. Ltd. and Trans-Rim Ltd. of Seattle have announced plans to build a recycled containerboard mill in Stockton with capacity for 350,000 tpy.

Spending for paper machine modifications and improvements is up 3.9% from last year's survey. Spending plans for rebuild projects totals $2.5 billion for 1990-92.

Rebuilds have contributed the most to new capacity in the containerboard sector, where few new paper machines are being installed. Wide-nip press installations have allowed linerboard and corrugating medium producers to raise capacity for far less than the cost of new machines. Containerboard mills with extensive machine modernization programs include Gaylord Container, Antioch, Calif.; Green Bay Packaging Corp., Green Bay, Wis., and Morrilton, Ark.; MacMillan Bloedel Inc., Pine Hill, Ala.; and Jefferson Smurfit Corp., Jacksonville, Fla.

U.S. mills report plans to spend $1.1 billion on power

U.S. GREENFIELD MILL PROJECTS
(short tons)

STARTED UP IN 1990

Alabama River Newsprint, Claiborne, Ala.
220,000-metric-tpy TMP/newsprint; Valmet machine
Kimberly-Clark, Jenks, Okla.
68,000-tpy tissue mill and converting operation
Mead, Mahrt, Ala.
375,000-tpy coated natural kraft paperboard
Willamette Industries, Bennettsville, S.C.
200,000-tpy uncoated free-sheet; Valmet paper machine

UNDER CONSTRUCTION OR ANNOUNCED WITH STARTUP DATE

Alabama Pine Pulp, Claiborne, Ala. **1991**
1,250-metric-tpy market bleached softwood kraft pulp
Caithness King, Pejepscot, Maine **1991**
550-tpd deinked market pulp mill
Fox River Fiber, Kaukauna, Wis. **1991**
200-tpd market deinked pulp plant
Kimberly-Clark, Loudon, Tenn. **1991**
C & I tissue mill; about half the size of Jenks mill
Mi Ho Paper, St. Joseph, Mo. **1991**
Recycled coated and uncoated fine paper mill
Daishowa America/Trans-Rim, Stockton, Calif. **1992**
350,000-tpy recycled containerboard mill
Kenaf Paper, Raymondville, Texas **1992**
30,000-metric-tpy kenaf-based newsprint mill
Inland Container, Maysville, Ky. **1993**
600-tpd recycled containerboard; Tampella machine
Scott Paper, Indiana or Kentucky **1993**
New tissue mill and converting operation

PROPOSED (NO STARTUP DATE)

Dunkirk Containerboard, Dunkirk, N.Y.
250,000-tpy recycled containerboard mill
Formosa Chemicals & Fibre, Wallace, La.
Proposed 1,000-metric-tpd dissolving pulp mill and rayon plant
Mead, Ontonogan, Mich.
Integrated coated free-sheet mill; mid-90s earliest
Northampton Paperboard, Northampton, Pa.
300,000-tpy recycled paperboard
Port Westward Pulp, Port Westward, Ore.
300,000-tpy market bleached softwood kraft pulp
Jefferson Smurfit, Unspecified town, N.Y.
250,000-metric-tpy recycled newsprint mill
Westbrook Wood Products, Klamath Falls, Ore.
Proposed publication papers mill

plant improvements during 1990-92, down 22.5% from last year's plans. Energy projects have slipped to a 7% share of spending. Largely due to lower energy prices, mills have been able to shift spending priorities to other areas. Power plant outlays have declined steadily since the early '80s as a percentage of total mill spending.

NEW MILLS AND MACHINES. New paper machines account for 31% of announced spending plans for the 1990-92 period. New paper machine announcements climbed dramatically in the late 1980s, and now 21 new machines at existing mills and another ten machines at new mills are scheduled for startup during the 1990-94 period. The most active grades for new machines are tissue, coated and uncoated free-sheet paper, newsprint, kraft paperboard, and recycled paperboard.

Eleven new paper machines came online in 1990, seven at existing mills and four at greenfield facilities. Mead Corp. completed a new $556-million coated natural kraft paperboard mill at Phenix City, Ala. Gaylord Container started up a new 1,000-tpd linerboard machine at Bogalusa, La., the first new linerboard unit to be built since 1985. Union Camp's $375-million modernization and expansion at Savannah, Ga., will replace two older units with a new kraft linerboard machine in 1991, and Jefferson Smurfit Corp. plans a new linerboard machine for its Fernandina Beach, Fla., mill.

In uncoated free-sheet, Willamette Industries Inc. started up a greenfield mill at Bennetsville, S.C., in 1990, and Boise Cascade has completed an extensive $525-million modernization and expansion program at International Falls, Minn. Union Camp will complete a $700-million expansion in 1991 that includes a new paper machine at its Eastover, S.C., mill. Also in 1991, Georgia-Pacific will complete a $500-million expansion at Ashdown, Ark., adding 325,000 tpy.

Champion International installed a new coated free-sheet unit at its Quinnesec, Mich., market pulp mill in 1990, and Scott Paper's S.D. Warren Div. built another lightweight-coated free-sheet unit at Skowhegan, Maine. In 1991, Consolidated Papers Inc. will complete installation of a new $400-million coated free-sheet machine at the Wisconsin Rapids Div. Boise Cascade announced plans for a $450-million coated groundwood expansion at Rumford, Maine, targeted for a late-1993 completion, but the project has been deferred due to poor market conditions.

Chesapeake's Wisconsin Tissue Mills in Menasha started up a new recycled tissue mill in 1990, and Kimberly-Clark brought online a new tissue mill at Jenks, Okla. K-C will start up a second new mill in 1991 at Loudon, Tenn. Fort Howard plans to install a fourth recycled tissue machine in 1991 at Rincon, Ga., and to add capacity at Muskogee, Okla., and Green Bay, Wis. Procter & Gamble plans to install two new tissue machines at mills east of the Rockies by 1993 and is studying expansion opportunities on the West Coast that could include another machine or even a new mill. ■

NEW PAPER MACHINES IN U.S. AT EXISTING MILL SITES

STARTED UP IN 1990

Boise Cascade, International Falls, Minn.
300,000-tpy, 348-in.-trim Valmet—uncoated free-sheet
Champion International, Quinnesec, Mich.
265,000-tpy, 280-in.-trim Beloit—coated free-sheet
Chesapeake, Menasha, Wis.
80,000-tpy Beloit twin-wire—recycled tissue
Consolidated Papers, Stevens Point, Wis.
59,000-tpy, 180-in. yankee fourdrinier—specialty coated
Gaylord Container, Bogalusa, La.
1,000-tpd, 270-in.-trim Beloit machine—linerboard
Longview Fibre, Longview, Wash.
240-in.-trim No. 12 Beloit machine—kraft paper
S.D. Warren, Skowhegan, Maine
Lightweight coated free-sheet machine

UNDER CONSTRUCTION OR ANNOUNCED WITH STARTUP DATE

Consolidated Papers, Wisconsin Rapids, Wis. **1991**
212,000-tpy, 285-in. fourdrinier—coated free-sheet
Fort Howard, Rincon, Ga. **1991**
250-tpd, 270-in. Beloit machine—recycled tissue
Georgia-Pacific, Ashdown, Ark. **1991**
325,000-tpy, 4,000-fpm Beloit—uncoated free-sheet
North Pacific Paper, Longview, Wash. **1991**
230,000-metric-tpy Beloit Bel Baie III-newsprint
Union Camp, Savannah, Ga. **1991**
460,000-tpy, 363-in. Valmet kraft linerboard machine
Union Camp, Eastover, S.C. **1991**
240,000-tpy, 372-in. Beloit machine—uncoated free-sheet
Federal Paper Board, Augusta, Ga. **1992**
To produce 650 tpd of either bristols or uncoated free-sheet
Potlatch, Lewiston, Idaho **1992**
204-in.-trim, 6,500-fpm Valmet Performer—tissue
Westvaco, Covington, Va. **1992**
350,000-tpy Voith machine—bleached paperboard
James River, Pennington, Ala. **1992-93**
New tissue machine
James River, St. Francisville, La. **1992-93**
New lightweight coated paper machine
James River, Old Town, Maine **1992-93**
New tissue machine
Procter & Gamble, eastern U.S. **1993**
Two new machines at mills east of the Rockies—tissue
International Paper, Selma, Ala. **1993-94**
300,000-tpy uncoated free-sheet

PROPOSED (NO STARTUP DATE)

Boise Cascade, Rumford, Maine
318,000-tpy, 325-in. LWC machine—delayed from 1993 target
Champion International, Courtland, Ala.
Considering 240,000-tpy uncoated free-sheet machine
Daishowa America, Port Angeles, Wash.
Studying two machines, one 220,000-tpy newsprint and one 150,000-tpy directory-delayed
Fort Howard, Muskogee, Okla. and Green Bay, Wis.
Potential sites for new recycled tissue machine
Fort Howard, Rincon, Ga.
Fifth recycled tissue machine for installation in mid-90s
Georgia-Pacific, Millinocket, Maine
Proposed world-class dry-crepe tissue machine
Golden State Paper, Pomona, Calif.
230,000-metric-tpy machine—recycled newsprint
Gulf States Paper, Demopolis, Ala.
Bleached paperboard machine; mid-1990s target
Lake Superior Paper Industries, Duluth, Minn.
A second SC-A paper machine is under study
Manville Forest Products, West Monroe, La.
Considering 800-1,000-tpd SUS coated board machine
Procter & Gamble, western U.S.
Considering new machine for West Coast location—tissue
Weyerhaeuser Paper, Springfield, Ore.
1,000-tpd linerboard machine, replacing older unit

CANADA

MILLS PLAN FEWER EXPANSIONS, MORE EMPHASIS ON ENVIRONMENT

■ After three years of record increases, Canadian pulp and paper companies cut back on capital spending in 1990, and further cutbacks are slated for 1991. According to the latest Statistics Canada data, the industry planned to spend C$4.44 billion on capital projects in 1990, down 13.5% from outlays of $5.13 billion in 1989. Canadian pulp and paper companies enjoyed strong markets and record prices during the late 1980s, enabling them to spend heavily for modernization and expansion projects. If spending drops off as expected, it will end three years of double-digit increases. The last period of such strong growth was ten years ago, when capital expenditures soared over 60% in both 1980 and 1981.

The industry has been plagued by lower prices for newsprint, a strong currency, and deteriorating markets for pulp, leading to lower profitability and cutbacks in capital spending. More directly, spending plans have dropped because of environmental concerns about massive greenfield development plans in western Canada. Alberta-Pacific Forest Products Ltd.'s proposed new $1-billion bleached kraft market pulp mill at Athabasca, Alta., is the best example. Originally slated for startup in 1991, the project is in danger of being canceled outright because of local concerns about the mill's impact on the environment (the Alberta-Pacific mill is not included in cost totals for this report).

While threatening new development, concerns about the environment will nevertheless fuel higher spending at existing mills over the next few years. The Canadian Pulp & Paper Assn. estimates that about 25% of capital expenditures in 1989 went for environmental programs. Spending for dioxin elimination, recycled fiber facilities, and air emission improvements is expected to remain high for the next several years. CPPA estimates that the industry must spend approximately C$3 billion a year to maintain and upgrade facilities to improve productivity and competitiveness. The additional need for environmental improvements should keep spending above this level. While markets remain weak, mills will cut back on expansion projects and concentrate their efforts in the environmental area.

Repap Enterprises Inc., for example, expects to cut its capital spending on all but environmental improvements and will postpone new projects, chairman George Petty said at the company's annual meeting. After spending $2.3 billion in the past five years, the company will invest only $100 million in 1991 and 1992. Repap had planned to spend $1.1 billion on a two-phase expansion and conversion of the Manfor mill in The Pas, Man.

Fletcher Challenge Canada Ltd. reduced its 1990 capital spending budget to $279 million from a previously estimated $425 million in the face of weaker pulp markets and heavy costs associated with meeting environmental standards, Ian Donald, president and CEO, said after his company's annual meeting. "We're down to spending only on those projects that are needed to meet environmental standards," he noted. Other projects, such as the proposed debottlenecking of the company's Mackenzie, B.C., pulp mill, have been deferred. The

CANADA—REPORTED CAPITAL EXPENDITURES FOR 1990-92 + BY REGION AND TYPE OF FACILITY (C$000)

	PRODUCTION-RELATED EXPENDITURES											
	WOOD/FIBER		PULPING		NEW MACHINES		MACHINE MOD.		ENERGY		MISC./PLANT	
Maritimes	26,040	9%	35,092	1%	0	0%	25,900	4%	12,000	2%	3,645	1%
Quebec	34,165	11%	1,218,793	27%	712,250	54%	223,131	31%	59,271	11%	100,974	40%
Ontario	12,100	4%	775,829	17%	245,000	19%	205,530	28%	151,250	27%	1,500	1%
Central	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
West	229,470	76%	2,441,811	55%	362,950	27%	270,000	37%	336,540	60%	146,122	58%
Total	**301,775**		**4,471,525**		**1,320,200**		**724,561**		**559,061**		**252,241**	

	ENVIRONMENTAL QUALITY SPENDING						TOTALS					
	WATER		AIR		SOLID WASTE		PRODUCTION		ENVIRONMENTAL		GRAND TOTAL	
Maritimes	63,575	3%	59,000	11%	6,325	9%	102,677	1%	128,900	5%	231,577	2%
Quebec	319,129	17%	69,135	12%	35,071	52%	2,348,584	31%	423,335	17%	2,771,919	27%
Ontario	119,601	6%	16,020	3%	510	1%	1,391,209	18%	136,131	5%	1,527,340	15%
Central	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
West	1,391,379	73%	417,675	74%	25,929	38%	3,786,893	50%	1,834,983	73%	5,621,876	55%
Total	**1,893,684**		**561,830**		**67,835**		**7,629,363**		**2,523,349**		**10,152,712**	

Mackenzie program would have added 40,000 tpy of market pulp capacity.

Canfor Corp. reduced capital spending from its previously budgeted C$160 million in 1990. Western Pulp Ltd. Partnership, recently acquired by Doman, plans to spend $70 million on environmental improvements over the next three years, but no other major capital projects are presently under consideration.

In eastern Canada, Abitibi-Price is preparing a new strategic plan. The company has not earmarked any more mills or machines for closure, but it will continue to concentrate on converting old mills to more specialized products. Environmental spending at Abitibi will also remain high. Estimated spending totaled $150 million in 1990, down from $260 million in 1989.

As in the U.S., companies are scrambling to install deinking capacity to meet demand for recycled paper. Abitibi-Price, Boise Cascade Canada Ltd., Bowater Mersey Paper Co., and Stone-Consolidated Inc. have all stated publicly that they are studying plans to incorporate secondary fiber in their newsprint operations. Donohue Inc. and James Maclaren Industries Inc. have proposed a joint-venture facility for Montreal. Cascades Inc., Noranda Forest Recycled Papers, and Kruger Inc. are also considering deinking expansions, and Orford Recycling Inc. has proposed a 120,000-tpy market deinked pulp mill for Drummondville, Que. Atlantic Packaging Products Ltd. will complete a new recycled newsprint and tissue mill this year in Whitby, Ont., and Daishowa Forest Products Ltd. announced last summer that it will install a large deinking plant for recycled newsprint and directory paper production at its Quebec City, Que., mill. In western Canada, Fletcher Challenge Canada and MacMillan Bloedel have agreed to take the output of a new market deinked pulp plant to be built by Newstech Recycling Inc. in Coquitlam, B.C. There are currently no deinking facilities in western Canada.

SPENDING BREAKDOWN. Canadian pulp and paper companies report plans to spend C$10.2 billion on mill projects during the 1990-92 period, down 21.1% from plans reported last year for the 1989-91 period. Projects started up in 1990 account for C$4.6 billion of the total, or 45%. Commitments for 1991 total C$3.2 billion, or 31% of planned outlays. Projects announced so far for future years amount to C$1.4 million for 1992, C$732 million for 1993, and C$235 million for 1994-95.

As in the U.S., the number of project announcements is trending downward in Canada. Because of project cancellations and postponements, announced spending for 1992 has fallen 57% since this time last year. Just over C$1 billion worth of projects originally scheduled for the 1990-92 period has been canceled outright, while another C$2.8 billion has been postponed.

Production-related projects account for C$7.6 billion of overall spending, down 29.5% from last year's survey. Spending is down in every part of the mill, led by a 46.5% drop in installations of new paper machines. Pulp mill improvements, the largest category in dollar terms, total C$4.5 billion, down 20.7% from last year.

Environmental expenditures climbed to C$2.5 billion for 1990-92, up 23.2% from plans reported last year for 1989-91. Spending for water quality improvements posted an 18.9% gain, to C$1.9 billion, following a 506% gain last year and a 122% increase the year before that. Companies reported air pollution control projects costing C$562 million for 1990-92, up 45.4% from last year. Spending for solid waste disposal is down 2.9%, however, to C$68 million.

CAPACITY EXPANSION BOOM. Growth rates have been higher than average in the Canadian industry since 1986, culminating in record expansion plans at the end of the decade. Business conditions began to sour in 1989, but the expansion boom continued to take shape, and in 1990, the industry found itself in the middle of a capacity expansion boom in its major grade segments as well as in a steep market downturn. Capital spending plans have plunged, and the three-year outlook for capacity expansion is down 20% from this time last year. Because those original plans were ambitious, however, overall growth will remain above average through 1992 despite the cutbacks.

Kraft market pulp capacity will climb to 7.86 million tpy by 1992, according to CPPA, an increase of 757,000 tpy, or 10.7%, over 1989. The high point of the boom appears to be 1991, when 426,000 tpy of new capacity will be added for a one-year increase of 5.8%.

Bleached softwood kraft pulp capacity is expected to

NEW PAPER MACHINES IN CANADA AT EXISTING MILL SITES (metric tons)

STARTED UP IN 1990

Canadian Pacific Forest Products, Thunder Bay, Ont.
240,000-tpy, 362-in. Valmet machine, replacing two—newsprint

Cascades, Kingsey Falls, Que.
25,000-tpy tissue machine

Stone-Consolidated, Grand'Mere, Que.
183,000-tpy machine, replacing two older units—groundwood specialties

UNDER CONSTRUCTION OR ANNOUNCED WITH STARTUP DATE

Kruger, Trois Rivieres, Que. **1991**
180,000-tpy, 300-in.-trim Beloit machine—newsprint

Perkins Papers, Candiac, Que. **1991**
48,500-short-tpy Valmet machine—recycled tissue

PROPOSED (NO STARTUP DATE)

MacMillan Bloedel, Powell River, B.C.
Mill upgrade may include new machine for higher-value grades

Vicell Canada Tissue, Delta, B.C.
9,000-tpy dry-form tissue machine

climb 355,000 tpy by 1992, a gain of 6.2% over 1989. Two major projects were completed in 1990 at existing mills: Howe Sound Pulp & Paper Co. Ltd.'s 350-tpd expansion at Port Mellon, B.C., and Weldwood of Canada Ltd.'s 215,000-tpy doubling of capacity at Hinton, Alta. In addition, Daishowa Canada Co. Ltd. recently brought online its new 340,000-tpy mill in Peace River, Alta.

In late 1991, Fletcher Challenge Canada Ltd. and James River-Marathon Ltd. are scheduled to complete major improvement programs adding 75,000 tpy and 178,500 tpy, respectively. A 235,000-tpy expansion program at Celgar Pulp Co.'s Castlegar, B.C., mill is targeted for completion in mid-1992.

Bleached hardwood kraft pulp capacity will jump 391,000 tpy by 1992 to 1.36 million tons, a substantial 40.4% increase over 1989, according to CPPA. Most of the extra capacity will result from three sources: Daishowa Canada's new Peace River mill; James Maclaren Industries Inc.'s 75,000-tpy expansion at Thurso, Que., in 1990; and Malette Inc.'s 1990-92 modernization program at Smooth Rock Falls, Ont., adding about 70,000 tpy of softwood and hardwood kraft output.

Mechanical market pulp has been one of the fastest growing sectors in Canada, but because of depressed markets it is unclear exactly how much of the announced new capacity will actually be built. Most observers report that mills are holding back until conditions improve. Even with a slowdown in new plans, however, capacity growth through 1992 will remain strong due to projects already under way or recently completed.

Donohue-Matane Inc. and Slave Lake Pulp Corp. were scheduled to complete new bleached chemi-thermomechanical pulp (CTMP) mills in late 1990. The Donohue mill in Matane, Que., will have capacity for 190,000 tpy, while the Slave Lake, Alta., mill will produce 110,000 tpy. In first-quarter 1991, Louisiana-Pacific Corp. plans to complete its new 157,500-tpy bleached CTMP plant in Chetwynd, B.C.

After a 50,000-tpy increase in 1990, newsprint capacity will jump 530,000 tpy this year, mostly on the strength of five new paper machines coming online in 1990 and 1991. A 300,000-tpy increase is slated for 1992.

Alberta Newsprint Co. Ltd. started up a new 220,000-tpy newsprint mill at Whitecourt, Alta., in fall 1990, and Atlantic Packaging Products Ltd. plans to bring a new 150,000-tpy machine online in late 1990 or early 1991. Canadian Pacific Forest Products Ltd. and Kruger Inc. also plan to start up new machines in late 1990/early 1991. CPFP's new 240,000-tpy No. 5 machine at Thunder Bay, Ont., will replace two older units for a 60,000-tpy net increase in capacity. Kruger's new machine at Trois Rivières, Que., will have capacity for 180,000 tpy, but about 70,000 tpy of the increase will be offset by conversion of No. 4 machine at Corner Brook, Nfld., to produce supercalendered paper. And also coming online will be Howe Sound Pulp & Paper Co. Ltd.'s new 535-tpd mill at Port Mellon, B.C., scheduled for startup in July 1991.

The current expansion boom was originally expected to be much larger than it has turned out to be, although it is still larger than any growth period since the 1970s. Collapsing prices put the squeeze on newsprint companies in 1989, resulting in a series of project cancellations, postponements, shutdowns of high-cost capacity, and conversions to other grades.

Four new machines will raise sanitary paper capacity by 31.4% to 666,000 tons in 1992. Atlantic Packaging Products, Whitby, Ont., and Irving Tissue Ltd., Saint John, N.B., each added a new machine early in 1990, and a third machine started up in early 1990 at Cascades Inc.'s Kingsey Falls, Que., mill. In mid-1991, Perkins Paper will start up a tissue unit at Candiac, Que. ■

CANADIAN GREENFIELD MILL PROJECTS
(metric tons)

STARTED UP IN 1990

Alberta Newsprint, Whitecourt, Alta.
220,000-tpy CTMP/newsprint mill
Atlantic Packaging Products, Whitby, Ont.
Recycled 35,000-tpy tissue and 150,000-tpy newsprint; two Voith machines
Daishowa Canada, Peace River, Alta.
340,000-tpy bleached hardwood kraft market pulp
Donohue Matane, Matane, Que.
190,000-tpy bleached market CTMP
Slave Lake Pulp, Slave Lake, Alta.
110,000-tpy market bleached CTMP

UNDER CONSTRUCTION OR ANNOUNCED WITH STARTUP DATE

Howe Sound Pulp & Paper, Port Mellon, B.C. **1991**
535-tpd TMP/newsprint mill; Valmet machine
Louisiana-Pacific, Chetwynd, B.C. **1991**
157,500-tpy bleached market CTMP
Newstech Recycling, Coquitlam, B.C. **1991**
122,500-tpy market deinked groundwood pulp
Interchem Industries, Port Clement, B.C. **1992**
100-tpd bleached sulfite market pulp mill
Millar Western Pulp, Whitecourt, Alta. **1992**
240,000-tpy bleached market CTMP mill

PROPOSED (NO STARTUP DATE)

Alberta-Pacific Forest Industries, Athabasca, Alta.
500,000-tpy bleached kraft market pulp; delayed by environmental challenge
Orenda Forest Products, Stewart, B.C.
300-tpd market bleached mechanical pulp mill
Orford Recycling, Drummondville, Que.
122,000-tpy market deinked pulp mill
Shin Ho Canada, Thunder Bay, Ont.
150,000-tpy bleached hardwood CTMP mill
Stake Technology, Mont Joli, Que.
100,000 bleached high-yield hardwood market pulp

*Complete results of P&P's exclusive survey of North American capital spending programs for 1990-92 are available in a separate **Mill-by-Mill Listings** report. Organized by company, the listings show programs for new mills and machines, rebuilds and modernizations, environmental quality control, and other mill improvements, with specifics on equipment ordered, dates, suppliers, and prices, where available. Subscribers to P&P's monthly newsletter, Project Report, receive a free copy of the report with their January issue. All others may obtain a copy of the report for US$145. To order, send payment to Pulp & Paper, Editorial Dept., 600 Harrison St., San Francisco, Calif. 94107.*

Paper Industry Engineering Salaries Back on Track with Median at $53,000

While salaries return to a normal upward trend, job morale is declining, possibly due to industry downturn, takeovers, and consolidation

By KELLY H. FERGUSON, Projects Editor

Following a slight decrease in 1989, professional salaries in the pulp and paper industry seem to be back on an upward track, according to *Pulp & Paper*'s 1990 salary and opinion survey. The 1989 survey showed a median salary of $52,000, down from $53,000 in 1988. The median salary is now back at $53,000, and in analyzing the 1989 results, this slight "dip" seemed at least partially due to an increase in entry-level professionals and the retirement of some older employees.

The 1990 survey results seemed to position professional salaries back in line with increases shown in previous surveys. Analysis of the age distribution of respondents shows a slight decrease in the percentage of younger professionals from 1989 to 1990, where there had been an increase from 1988 to 1989.

However, high operating rates and the numerous capital projects under way during 1990 continued to attract younger engineers to the industry—a fact that seemed to keep the median salary from reaching higher than the 1988 level. About 40% of respondents had been with their current employer five years or less. In actual number of years, 11% said they have been with their current employer one year or less and 11% said two years.

BACKGROUND OF SURVEY. *P&P*'s annual survey is based on responses to a questionnaire included in the September 1990 issue. Information from the returned forms was processed by an independent data processing firm according to *P&P*'s specifications. Data from 1990 are compared with data from our 1989 survey to provide readers a perspective on changes in compensation, benefits, and employee attitudes.

The report is designed to compare the progress of employees (specifically engineers) in the paper industry, on the supplier and consulting side as well as in primary manufacturing, with professional peers in various other disciplines. In addition, the report compares the salaries of specific engineering types and functions within the paper industry.

TABLE 1: **Salary distribution of all respondents.**

	Salary ($1,000)		
	1990	1989	% change 1989-90
Lower decile	36	33	+9
Lower quartile	43	41	+5
Median	53	52	+2
Upper quartile	67	65	+3
Upper decile	82	79	+4

AN OVERALL PROFILE. Respondents' median income has increased 2% since 1989 (Table 1), and comparing the salary distribution with 1988 results shows that salaries are probably returning to the trend of steady increases, although the higher salary level (upper decile) is still $3,000 less than in 1988. This again shows that retirement is possibly cutting out older, higher-paid respondents.

Most respondents (88%) continue to be happy with their jobs. However, there is a significant shift in attitude toward paper industry employment, especially concerning whether respondents would stay in the paper industry if they changed jobs. In 1989, 85.3% said they would stay in the paper industry. The 1990 results show that only 64% would stay, 4% would leave, and 30% weren't sure.

There is an indication that some experience is leaving the industry. In comparing the distribution of years of experience in the industry, there was about a 5% decrease in respondents with ten to 20 year's experience. This range of years has typically increased in past surveys. Also in past surveys, chemical engineers have normally made up the largest single group of respondents. But the 1990 survey had significantly less chemical engineers responding (12% in 1990 compared with 17% in 1989). This decrease possibly indicates a shift by chemical engineers to other industries (such as petroleum, food) that are experiencing an upturn as the paper industry begins a downturn.

Mechanical engineers made up the largest percentage of bachelor degrees for respondents (16%). Business de-

Reader opinions

Pulp & Paper's salary survey asked readers to comment on the industry, their jobs, and their companies. Most opinions focused on readers' reasons for low morale, such as declining benefits, company restructuring, and problems with management. Comments have not been edited for content (only for grammar and style as necessary) to retain their originality. The following were chosen as typical of responses received.

"I've just changed from shift leader to process engineer. It's just like emerging from a dark, wet sewer into the light of day."

—technical service/Midwest

"Everyone needs to cut down on all the paperwork these days. We spend too much time justifying our work, which is holding our country back."

—engineering design/Midwest

"I am finding that there are not many young people like me that are interested in this industry."

—product development/West

"Engineers need higher, long-term salaries to attract more people to the field."

—process control/Southeast

"My company does a lot of good R & D, but very little gets implemented by us. We need to improve the link between development and implementation."

—R & D/Northwest

"After working in the chemicals industry, I am surprised at the lack of progressive attitudes and actions in the pulp and paper industry."

—R & D/Southeast

"I feel the company should sponsor people from our mill to go to other mills to see how they operate, then return to our mill with a report."

—production and mill operations/Southeast

"Wood procurement management is the best job in the paper industry."

—wood procurement/Northeast

"Our company fills nearly all high-level jobs from outside. This is demoralizing to experienced, highly trained, loyal employees."

—engineering/Southeast

"Too conservative, old guard is not allowing sufficient compensation to keep three- to ten-year employees on board."

—sales and marketing/Northeast

"We must do a better job of training hourly employees."

—engineering/Southeast

"Having the ability to practice my degree and participate in profit sharing/bonuses would help keep me at my present location."

—production and mill operations/Southeast

"Too much travel in my job. I'd leave just to get away from that. Otherwise, I love my work."

—technical service/Mid-Atlantic

"It has been a good industry for me to work in, but I don't encourage my children to get into it."

—engineering/Northwest

"Our business is very project oriented, and thus at times, it requires extensive overtime, for which management is not compensated. This needs to change if we are to continue to attract high-quality candidates."

—production and mill operations/West

"As the company increases in size, the impersonal character grows disproportionately. The ability to get meaningful input is approaching zero."

—administration/Northwest

"During the past two years, our company has begun employee involvement and SPC training, which has created a lot of strength in its task force teams. They are genuine in their concern for employees."

—administration/Southeast

"The paper industry is socially irresponsible, and I am seeking employment in a decent industry."

—sales and marketing/Northeast

"The paper industry must become more liberal with vacations to match other industries. Otherwise, it is the most fascinating industry I've been associated with."

—production and mill operations/Midwest

"Tremendous changes are taking place with quality and management-style programs."

—production and mill operations/Northwest

"Too much emphasis is placed on achieving goals by the time set, despite unexpected serious problems and the fact that the time factor was initially arbitrary. Effective problem-solving counts for nothing if arbitrary deadline is missed."

—process control/Mid-Atlantic

"My company reorganizes every two to four years and ends up with more administrators and fewer people to do the work."

—engineering/Northwest

"I wish they built paper mills in nicer locations."

—production and mill operations/Northeast

grees remained almost the same (16%), as did paper science and technology (14%).

Other averages for respondents were drawn: the majority is male (94%), has a bachelor's degree (58%), and works for a wood products/pulp and paper manufacturer (64%) in either production/mill operations (17%), engineering design (16%), or technical service/quality control (14%). Job stability has been steady during 1990, with about 20% having changed employers in the last three years. Other statistics include the following:

Compensation

- The average number of salary increases in the past three years is three.
- The last pay increase for respondents was 5%.

TABLE 2: **Benefits of respondents.**

	% of respondents	
Benefits	**1990**	**1989**
Medical insurance	98	98
Life insurance	94	94
Retirement pension plan	88	88
Dental insurance	85	84
Education allowance	50	49
Stock option plan	39	41
Profit sharing	38	36
Bonus plan	34	33
Travel budget	25	28
Company car	12	13

TABLE 3: **Income and type of employment organization.**

	Income ($1,000)					
Employing organization	**Lower decile**	**Lower quartile**	**Median**	**Upper quartile**	**Upper decile**	**% change in median 1989-90**
Academic	40	40	52	115	115	+44
Government	24	30	41	51	60	+14
Wood/pulp/paper—engineering	37	45	54	65	85	+8
Wood/pulp/paper—manufacturing	36	43	53	65	80	+4
Consulting firm	36	47	60	75	89	−8
Self-employed consultant	44	55	78	98	150	+18
Wood/pulp/paper—supplier	35	45	55	70	85	+4
Wood/pulp/paper—converter	35	44	49	60	72	−2
Other	35	42	50	72	96	−9

TABLE 4: **Income and principal work function.**

	Income ($1,000)						
Principal function	**Lower decile**	**Lower quartile**	**Median**	**Upper quartile**	**Upper decile**	**% change in median 1989-90**	**Respondents**
Administration	37	50	62	82	100	−5	141
R & D	35	45	60	71	84	+13	107
Consulting	34	50	65	80	105	+7	86
Engineering design	37	45	53	64	75	+4	247
Teaching/academic	37	37	40	115	115	+33	3
Product development	35	40	51	57	63	−15	25
Production and mill/ plant operation	39	45	54	68	81	+2	274
Engineering/ maintenance	39	46	53	64	71	+10	170
Sales and marketing	38	45	56	73	88	+6	163
Technical service/ quality control	33	37	45	55	65	0	218
Other	33	41	52	65	85	+4	122

TABLE 5: **Income and level of supervisory management.**

	Income ($1,000)					
Supervisor responsibility	**Lower decile**	**Lower quartile**	**Median**	**Upper quartile**	**Upper decile**	**% change in median 1989-90**
None	28	36	45	56	71	+10
Indirect or staff	35	40	48	60	72	+4
Team or unit	39	45	52	58	66	+8
Project or section	38	47	55	65	75	+4
Major department or division management	42	52	67	78	93	+6
Corporate management of organization	48	60	80	100	143	+1

FIGURE 1: **Income and type of wood/pulp/paper company, all respondents.**

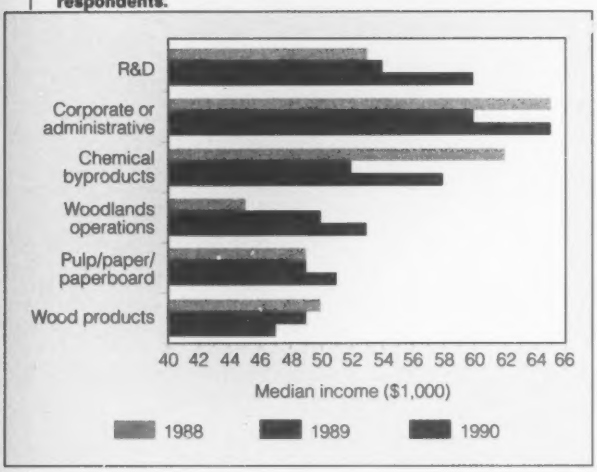
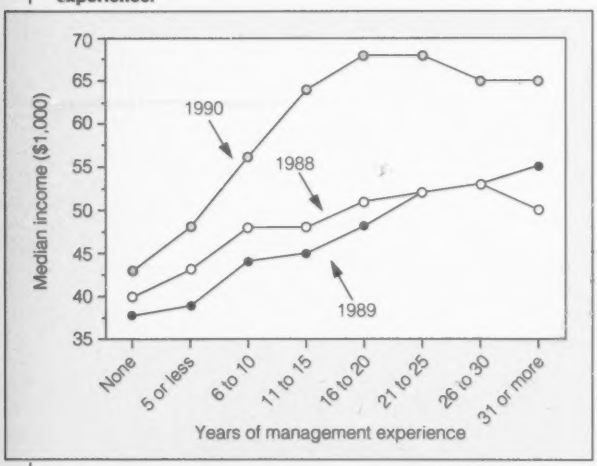


FIGURE 2: **Income and number of years of management experience.**



- Eleven paid holidays and three weeks of vacation are taken yearly.
- Most salaries are reviewed annually (90%) and are based on merit/performance (51%), cost of living (5%), or both (29%).
- Eighty-two percent are not paid overtime (a 3% decrease since 1989).
- Fifty-one percent have not been promoted in the past three years, while 34% have been promoted once.

Personal

- Ninety-six percent of respondents work full-time; 2% are self-employed.
- The average respondent's work experience since leaving school is between five and nine years (17%—a major change from 1989, when the average was between 15 and 19 years).
- Eighty-five percent have some kind of management responsibility; the majority have indirect or staff (23%), followed by major department or division management (21%).
- Twenty-six percent have advanced degrees (master's, doctorate, or MBA).
- Thirty-seven percent came from another industry.

Morale

- Sixty-four percent say they would stay in the paper industry if they changed jobs.
- Eighty percent say their company listens to them and values their experience (a decrease of 3% from 1989).
- On a scale of 1 (bad) to 5 (good), 41% ranked their job morale as above average (4), and 20% ranked their job morale as a 5. However, this is significantly lower than in 1989. In 1989, 80% ranked their morale at either 4 or 5, and there were no respondents ranking their morale as average (3). In the 1990 survey, 23% of respondents ranked their morale as average.

ANALYZING EFFECTS ON INCOME. Tables 1 through 6 and Figures 1 and 2 present survey findings on compensation compared with a number of variables, including type of employing organization, principal work function,

TABLE 6: **Income and educational field (bachelor's degree only).**

	Income ($1,000)					
Discipline	**Lower decile**	**Lower quartile**	**Median**	**Upper quartile**	**Upper decile**	**% change in median 1989-90**
Forestry/agriculture	40	42	52	68	80	−10
Chemistry	27	39	49	61	76	−4
Mechanical engineering	37	45	53	67	82	+2
Chemical engineering	36	42	50	63	80	0
Civil engineering	46	53	60	68	85	na
Electrical engineering	36	45	57	65	79	+2
Industrial engineering	39	42	54	63	77	−4
Mathematics/physics	40	44	75	85	90	+42
Computer science	34	41	53	57	60	+43
Biology/life science	36	40	47	52	58	−8
Paper science and technical	36	42	51	62	72	+34
Environmental science	30	38	46	73	75	+5
Business	31	42	50	70	85	−4
Liberal arts	34	40	50	70	95	+28
Other	25	35	44	55	69	+59

supervisory level, and degree. Income figures in all tables were obtained by adding any bonuses or additional income reported by respondents to their reported gross salaries.

Table 2 shows slight increases in the number of respondents receiving education allowance, dental insurance, profit sharing, and bonus plan. One significant decrease occurred in travel budgets, indicating that some companies are probably beginning to conserve on spending.

Table 3, comparing income and type of employment organization, shows that consultants have the highest median income, at between $60,000 (consulting firm) and $78,000 (self-employed consultant). Because of a low response, median salaries for those in academia and government are not statistically significant.

Table 4, comparing income and principal work function, shows that the highest median salary ($65,000) again belongs to those in consulting. Administration was close behind with $62,000, but that category dropped 5% from 1989. The group making the largest increase was from R&D, with a 13% increase in median income to $60,000. Engineering/maintenance also posted a significant gain (10%) to $53,000. Again, the small response from academia renders their salary numbers statistically insignificant.

Those at the corporate management supervisory level (Table 5) had the highest median income ($80,000). Table 6, as with past surveys, possibly presents misleading data comparing income and educational field. Small numbers of respondents in many of the categories make results difficult to interpret statistically.

Comparing income with number of years with current employer shows that staying with one employer pays off. Income rises throughout years one to 20 but levels off at that point.

Figure 1 compares income and the type of wood/pulp/paper company for respondents. Wide swings in the chemical byproducts category are not statistically significant due to a small response. R&D continued a gain in median salary as did most others, except in wood products, which showed a 4% decline. As expected, for those who do manage, income increases with the number of years of management experience (Figure 2). ■

Full results of *P&P's* 1990 salary and opinion survey are available for $50, payable to MILLER FREEMAN PUBLICATIONS. Please send requests to:

Kelly H. Ferguson
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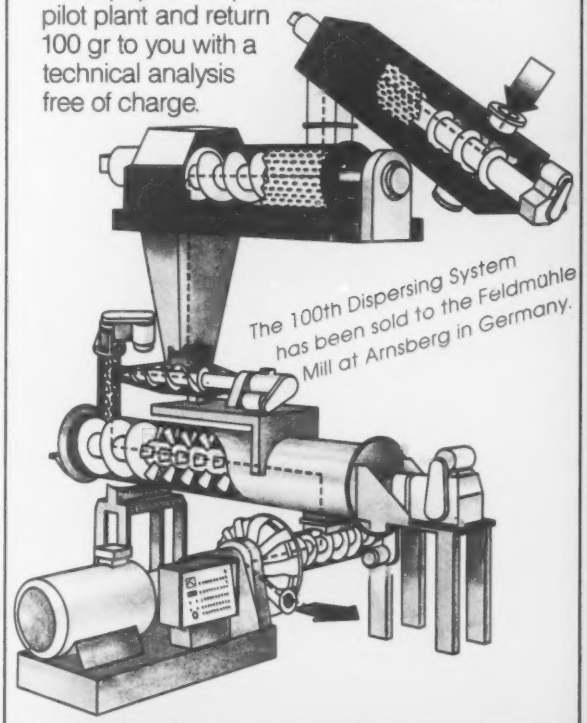

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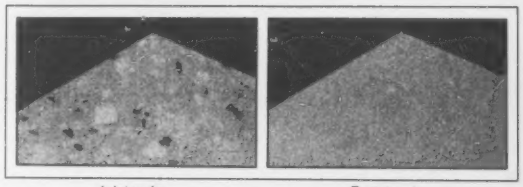

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